

TOP SECRET

EXHIBIT

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**CIVIL ACTION NO. 3-99CV1154-M**

**WILLIAMSON PRINTING CORP.,  
BILL L. DAVIS, and  
JESSE S. WILLIAMSON,**

**FIRST AMENDED ORIGINAL COMPLAINT**

In order to permissively join Ronald M. Rendleman as a plaintiff, to add certain causes of action, and to make miscellaneous changes, Plaintiffs, Printing Research, Inc., Howard W. DeMoore, and Ronald M. Rendleman (collectively "Plaintiffs"), file this First Amended Original Complaint against Defendants Williamson Printing Corporation, Bill L. Davis, and Jesse S. Williamson (collectively "Defendants"). Plaintiffs would show the Court the following:

1. Plaintiff Printing Research, Inc. ("Printing Research") is a corporation organized and existing under the laws of the State of Texas and has its principle place of business at 10954 Shady Trail, Dallas, Texas 75220.

2. Plaintiff Howard W. DeMoore ("DeMoore") is an individual with a business address of 10954 Shady Trail, Dallas, Texas 75220.

3. Plaintiff Ronald M. Rendleman ("Rendleman") is an individual with a business address of 10954 Shady Trail, Dallas, Texas 75220. Rendleman was not originally a party to this

suit but permissively joins now as a plaintiff, pursuant to Federal Rule of Civil Procedure 20, because he asserts rights to relief jointly, severally or in the alternative arising out of the same transaction, occurrence or series of transactions or occurrences as do Printing Research and DeMoore and involving or raising questions of law and fact common to all plaintiffs in this action.

4. On information and belief, Defendant Williamson Printing Corporation ("WPC") is a corporation organized and existing under the laws of the State of Texas and has its principal place of business at 6700 Denton Drive, Dallas, Texas 75235. WPC was served previously in this matter, appeared, and gave answer.

5. On information and belief, Defendant Bill L. Davis ("Davis") is an individual residing at 1126 Tipton Road, Irving, Texas 75060. Davis was served previously in this matter, appeared, and gave answer.

6. On information and belief, Defendant Jesse S. Williamson ("Williamson") is an individual residing at 5738 Caruth Boulevard, Dallas, Texas 75209. Williamson was served previously in this matter, appeared, and gave answer.

#### JURISDICTION AND VENUE

7. Arising under the patent laws of the United States, this action seeks to correct the designation of inventorship which currently appears on United States Patent No. 5,630,363 ("the '363 patent") under 35 U.S.C. §256. Additionally, this action seeks relief from the infringement of the '363 patent under 35 U.S.C. § 271 and to recover attorneys' fees for this action under 35 U.S.C. § 285. This Court, therefore, has subject matter jurisdiction under 28 U.S.C. § 1338. As to all other causes of action alleged herein, this Court has supplemental jurisdiction under 28 U.S.C. §1367.

8. On information and belief, Davis and Williamson reside in this District, and WPC maintains its primary place of business in this district. Accordingly, Defendants are subject to the personal jurisdiction of this Court.

9. Venue is proper in this Court under 28 U.S.C. § 1391(b), (c) and 1400(b).

10. Defendants have appeared and answered and have not contested jurisdiction or venue.

### **BACKGROUND**

11. DeMoore has invented, developed, marketed, and sold innovative equipment and supplies for the printing industry for over thirty years, and currently serves as Chairman of Printing Research, a corporation dedicated to providing such equipment and supplies to printers across the globe. Rendleman is a Printing Research employee, who works closely with DeMoore.

12. During 1994 and 1995, building upon DeMoore's prior work with lithographic and flexographic printing technology, DeMoore and Rendleman conceived, developed, and reduced to practice a single-pass printing process and apparatus having successive printing stations for selectively applying printing inks and coatings to paper and other substrates, in which one of the stations utilizes a flexographic process and at least one of the successive stations utilizes a lithographic process. Plaintiffs termed this new invention the "Lithoflex®" system. DeMoore, Rendleman, and Printing Research developed a commercial apparatus, termed a printer/coater unit or sometimes referred to as a Rendleman coater, for use with existing printing presses, which would allow those printing presses to utilize the Lithoflex® system. Printing Research is licensed under all of DeMoore's and Rendleman's rights to the inventions represented by the Lithoflex® system and the printer/coater unit.

13. Beginning in 1994, DeMoore and Rendleman conceived of and began development of the Lithoflex® system.

14. No later than October of 1994, Plaintiffs tested certain flexographic coating technology using a two-color Heidelberg lithographic press (the "pilot press") located at a Printing Research facility. The testing produced samples (the "flexographic samples") illustrating potential applications of that technology. No later than December 1994, Rendleman had reduced to drawings the concept of a printer/coater unit (the "Rendleman coater") that would move on a retractable mechanism with a ferris-wheel-type motion. The mechanism permitted the printer/coater unit to easily convert an upstream lithographic station to flexographic printing for employing the Lithoflex® process and this made it possible for the practical application of such process.

15. WPC is today, and was in 1994, a provider of commercial printing services. WPC utilized a Heidelberg CD multi-color press at its Dallas facilities (the "WPC press").

16. Because the WPC press was of the size and type appropriate for further development of the Lithoflex® system and believing WPC to be a potential customer of the Lithoflex® system, Plaintiffs contacted WPC through Printing Research employees Steve Garner ("Garner") and John Bird ("Bird") in order to secure use of the WPC facilities. In November 1994, Bird and Garner showed representatives of WPC the flexographic samples and briefly described the Lithoflex® system. Following the presentation, WPC expressed interest in acquiring rights to the Lithoflex® system technology for use in its own systems.

17. In 1994 and 1995, but well prior to August 14, 1995, Printing Research disclosed to WPC further details of the Lithoflex® system and the printer/coater units. In December of

1994, Printing Research demonstrated components of the Lithoflex® system to representatives of WPC, including Davis and Williamson, using Printing Research's pilot press.

18. Printing Research's disclosure of the Lithoflex® system concept and technology to WPC was made under a confidentiality agreement ("the Confidentiality Agreement") between Printing Research and WPC, in which, in exchange for the concept and details of the Lithoflex® system and the printer/coater units, WPC agreed to maintain the confidentiality of the same.

19. WPC and Printing Research thereafter entered into a purchase agreement ("the Purchase Agreement") whereby Printing Research agreed to sell several printer/coater units to WPC and install the same on WPC presses. Under the terms of the agreement, WPC obtained a free unit and would pay greatly reduced prices for additional printer/coater units and installation in exchange for allowing Printing Research access to WPC's presses for further fine-tuning of the Lithoflex® system.

20. Under the terms of the Purchase Agreement, Printing Research delivered a printer/coater unit to WPC on or about November 15, 1995. The Rendleman coater was installed on the first station of WPC's press for testing. Subsequent stations in the WPC press line were lithographic printing stations. The first sheets were "Lithoflexed" on the WPC press using the printer/coater unit on or about December 6, 1995. The testing of the printer/coater unit on the WPC press was a success. This test was made with Printing Research personnel in full charge of the Rendleman coater.

21. On information and belief, WPC continues to utilize the Lithoflex® system, including the printer/coater units.

22. On August 14, 1995, Davis and Williamson caused U.S. Application Serial No. 515,097 ("the '097 application), for a "Combined Lithographic/Flexographic Printing Apparatus

and Process,” to be filed with the United States Patent & Trademark Office (“PTO”). The '097 application named only Davis and Williamson as inventors, and was subsequently assigned to WPC. Defendants never informed Plaintiffs of an intent to file or of the fact of filing the '097 application. On information and belief Davis and Williamson are employees of WPC. The application issued as the '363 patent, which describes and claims the Lithoflex® system and names Davis and Williamson as inventors and WPC as assignee. The '363 patent remains assigned to WPC.

23. An earlier application, which was directed more to the Rendleman coater—although in the context of the Lithoflex® process, was filed by Printing Research, naming DeMoore, Rendleman, and Bird as inventors. This application was filed May 4, 1995, and it is still pending.

24. On information and belief, Davis and Williamson are not actual inventors of the claimed invention of the '363 patent. The Lithoflex® system and apparatus as invented by DeMoore and Rendleman and explained to WPC by Printing Research includes all the limitations of the claims of the '363 patent. DeMoore and Rendleman are therefore the inventors of the invention claimed in the '363 patent. On information and belief, Defendants knew throughout the prosecution of the '363 patent that DeMoore and Rendleman were the actual inventors of the claimed invention of the '363 patent, and intended to fraudulently and wrongfully deprive Plaintiffs of the benefits of their invention.

25. The omission of DeMoore and Rendleman from the list of named inventors in the '097 application and the '363 patent was committed by Defendants alone, and, therefore, without any deceptive intent on the part of Plaintiffs.

26. Having successfully tested the Lithoflex® system and printer/coater unit on the WPC press, Printing Research endeavored to market the Lithoflex® system to other potential buyers. To that end, representatives of Printing Research contacted Hallmark Cards, Inc. ("Hallmark") for the purpose of selling Lithoflex® system components to Hallmark.

27. Negotiations between Printing Research and Hallmark regarding the sale of Lithoflex® system components to Hallmark ensued and progressed to a point where agreement appeared imminent. Before entering a purchase order with Printing Research, however, Hallmark commissioned a patent infringement search to examine the propriety of Hallmark's proposed use of the Lithoflex® system.

28. On information and belief, and as a result of this patent infringement search, counsel for Hallmark became aware of the '363 patent, evaluated the proposed use of the Lithoflex® system in light of the '363 patent, and concluded that the proposed use would infringe the '363 patent. Upon being informed by counsel of the potential for patent infringement posed by the use of the Lithoflex® system, and as a direct result of the existence of the '363 patent, Hallmark concluded that it would not purchase any Lithoflex® system components from Printing Research.

29. In December of 1998, Hallmark informed Printing Research of the existence of the '363 patent, and that Hallmark would not purchase any Lithoflex® system components from Printing Research. Hallmark further indicated to Printing Research at this time that Hallmark's purchasing decision was based on the existence of the '363 patent and the potential for infringement of the same.

30. Plaintiffs had no knowledge of the '097 application or of the '363 patent prior to being informed of the patent's existence by Hallmark.

31. Defendants' acquisition and WPC's ownership of the '363 patent directly resulted in the loss of prospective sales to Hallmark, by Printing Research, of Lithoflex® system components and supplies. Defendants' acquisition and WPC's ownership of the '363 patent has further subsequently resulted in a general inability by Plaintiffs to exploit the Lithoflex® system, for example, by selling Lithoflex® system components and supplies to Hallmark and other companies.

32. Upon information and belief, Defendants applied for and secured the issuance of the '363 patent, and WPC secured ownership of the '363 patent, with full knowledge of the nature of the exclusive rights conferred by the '363 patent, namely the exclusive right to make, use, sell, or offer to sell the claimed invention of the '363 patent.

33. Upon information and belief, Defendants applied for and secured the issuance of the '363 patent, and WPC secured ownership of the '363 patent, with full knowledge that potential users of the claimed invention of the '363 patent, including potential customers of Plaintiffs, would become aware of the '363 patent and would, therefore, likely forego purchases of Lithoflex® system components or supplies from Plaintiffs.

34. Thus Defendants applied for and secured the issuance of the '363 patent, and WPC secured ownership of the '363 patent, with full knowledge that their actions would severely limit Printing Research from making, using, or selling the claimed invention of the '363 patent, thus damaging Plaintiffs through the loss of prospective sales of Lithoflex® system components and supplies.

35. On information and belief, Defendants intended their acquisition and ownership of the '363 patent to prevent Plaintiffs from selling Lithoflex® system components and supplies.

36. Defendants' failure to inform Plaintiffs of the '097 application and the '363 patent resulted in Plaintiffs wasting time, effort, and funds in attempting to market Lithoflex® to prospective buyers, who would not purchase components or supplies once they had discovered the '363 patent. Defendants were aware of Plaintiffs' ongoing marketing efforts and, nevertheless, concealed the fact of the '097 application and the '363 patent.

37. On May 20, 1999, Defendants caused to be filed Reissue Application, Serial No. 09/315,796 (the "Reissue Application") seeking reissue of the '363 patent naming Davis and Williamson as inventors and WPC as assignee. Since that time, Defendants have continued to actively seek approval of the Reissue Application despite having been informed that Plaintiffs (1) contest inventorship and (2) contend that the '363 patent has interfered and continues to interfere with prospective contracts and business relations—including, without limit, prospective contracts and relations with Hallmark. On information and belief, Defendants intend the Reissue Application and its hoped-for approval to prevent Plaintiffs from selling Lithoflex® system components and supplies and to interfere with Plaintiffs' prospective contracts and business relations with third parties.

## COUNT I

### CORRECTION OF INVENTORSHIP

38. Plaintiffs repeat the allegations of Paragraphs 11-37 above.

39. The '097 application, the '363 patent, and the Reissue Application incorrectly omit DeMoore and Rendleman as inventors of the methods or apparatus claimed therein. The '097 application, the '363 patent, and the Reissue Application further incorrectly list Davis and Williamson as inventors of the methods and apparatus claimed therein, despite the fact that neither Davis nor Williamson is a sole or joint inventor of any method or apparatus so claimed.

DeMoore and Rendleman are the inventors of all methods and apparatus claimed in the '097 application, the '363 patent, and the Reissue Application in so far as the claims being sought are appropriate and within the scope of the invention contained in the '363 patent. Defendants omitted DeMoore and Rendleman from the list of inventors designated in the '097 application, the '363 patent, and the Reissue Application, and that omission occurred without any deceptive intent on the part of Plaintiffs.

40. The PTO, through the Commissioner, is empowered to correct inventorship, errors, including misjoinder, where error lists a person who is not an inventor, and nonjoinder, where error fails to list a person who is an inventor. Independently, under Title 35, United States Code, §256, the federal courts, and thus this Court, may, on notice and hearing of all parties concerned, determine the inventorship of any patent and make corrections as appropriate.

41. Concurrent with the original filing of this action and with the filing of this amended complaint, Plaintiffs notified each person and entity believed to be affected by Plaintiffs' claim that the designation of inventorship of the '363 patent is incorrect. Such persons include the currently designated inventors of the '363 patent, Davis and Williamson, and the assignee of Davis' and Williamson's rights to the '363 patent, WPC. Each such person or entity is in fact a named defendant in this suit and has been provided with a copy of the original complaint as well as this pleading.

42. Pursuant to Title 35, United States Code, § 256, Plaintiffs request the Court, after an appropriate hearing, to order correction of inventorship of the '363 patent. Plaintiffs specifically request that the Court remove Davis and Williamson as named inventors for the '363 patent and add DeMoore and Rendleman as the actual joint inventors for the '363 patent. In the alternative, if the Court determines that DeMoore and/or Rendleman were co-inventors with

Davis and Williamson of the subject matter claimed in the '363 patent, then Plaintiffs specifically request that the Court add DeMoore and/or Rendleman as joint inventors for the '363 patent according to its determination.

## COUNT II

### PATENT INFRINGEMENT

43. Plaintiffs repeat the allegations of Paragraphs 11-42 above.

44. DeMoore and Rendleman are the actual inventors of the claimed invention of the '363 patent, and as such hold equitable title to the '363 patent with standing to sue for infringement of the '363 patent.

45. Davis and Williamson are not actual inventors of the '363 patent and possess no rights under the '363 patent. The assignment of Davis' and Williamson's "rights" under the '363 patent to WPC therefore conveys no actual rights under the '363 patent to WPC. Specifically, WPC possess no right to make, use, or sell the claimed invention of the '363 patent.

46. Upon information and belief, WPC has used and continues to use the claimed methods and apparatus of the '363 patent in its printing operations in this judicial district and elsewhere.

47. Upon information and belief, WPC's use of the claimed methods and apparatus of the '363 patent in its printing operations constitutes infringement in violation of 35 U.S.C. §271 and Plaintiffs' exclusive rights under the '363 patent.

48. On information and belief, WPC will continue to engage in acts of infringement unless permanently enjoined by this Court.

49. The infringement of the '363 patent by WPC has caused irreparable injury to Plaintiffs and will continue to cause irreparable injury to Plaintiffs unless WPC is permanently enjoined by this Court.

50. The infringement of the '363 patent by WPC has caused and continues to cause damage to Plaintiffs, including impairment of the value of the '363 patent and lost sales and profits in an amount yet to be determined.

51. On information and belief, WPC's infringement of the '363 patent in this judicial district and elsewhere has been and continues to be willful.

### COUNT III

#### CONVERSION

52. Plaintiffs repeat the allegations of Paragraphs 11-51 above.

53. DeMoore and Rendleman are the actual inventors of the methods and apparatus claimed in the '363 patent, and as such, on May 20, 1997, the date of issue of the '363 patent, DeMoore and Rendleman held equitable title to the patent rights associated with that invention.

54. On May 20, 1997, in the City of Dallas, Dallas County, Texas, Defendants unlawfully and without authority assumed dominion and control over DeMoore and Rendleman's property, which is described in Paragraph 46, to the exclusion of DeMoore and Rendleman's rights in this property, in that on that date the '363 patent issued to Defendants. Defendants thus assumed the exclusive right to make, use, sell or offer to sell the claimed invention of the '363 patent, thereby preventing DeMoore and Rendleman from enjoying any benefits of the invention.

55. The value of the property at the time and place of the conversion was far in excess of \$450,000, for which sum Plaintiffs sue.

56. Plaintiffs are entitled to interest on the sum of \$450,000 from May 20, 1997, at the prejudgment rate of interest.

57. The harm to Plaintiffs resulting from Defendants' conversion of the property rights inherent to the '363 patent, as alleged above, resulted from malice. Accordingly, Plaintiffs ask that exemplary damages be awarded against the Defendants.

58. The harm to Plaintiffs resulting from Defendants' conversion of the property rights inherent to the '363 patent, as alleged above, resulted from fraud. Accordingly, Plaintiffs ask that exemplary damages be awarded against the Defendants. Defendants' conversion of the property rights inherent to the '363 patent, as alleged above, and the associated damage to Plaintiffs resulted from fraud for at least the following reasons: (1) the conversion was accomplished through affirmative misrepresentations of the inventorship of the claimed methods and apparatus, made by Defendants to the PTO during the application for and prosecution of the '363 patent, with full knowledge of the inaccuracy of those statements and to the detriment of DeMoore and Rendleman, the actual inventors of the invention; (2) the conversion was accomplished through affirmative misrepresentations relied on by Plaintiffs to their detriment that the information conveyed by Plaintiffs to Defendants would not be disclosed; (3) the conversion was accomplished by failing to tell Plaintiffs of the '097 application when, in light of their previous representations, Defendants had a legal duty to inform Plaintiffs.

#### COUNT IV

#### TORTIOUS INTERFERENCE WITH PROSPECTIVE BUSINESS RELATIONSHIP AND WITH PROSPECTIVE CONTRACT

59. Plaintiffs repeat the allegations of Paragraphs 11-58 above.

60. Defendants obtained the '363 patent, knowing that DeMoore and Rendleman were the actual inventors of the methods and apparatus claimed therein, and knowing and intending

that these actions could prevent Plaintiffs from exploiting the claimed invention of the '363 patent through the sale of Lithoflex® system components and supplies.

61. In 1998, Plaintiffs and Hallmark agreed in principle, pending the completion of a patent infringement study, to a purchase order in which Plaintiffs would sell Lithoflex® system components and supplies to Hallmark.

62. A Hallmark patent infringement study revealed the existence of the '363 patent to Hallmark. Hallmark subsequently chose not to agree to the purchase order, based, in whole or in part, upon a fear of potential liability for infringement of the '363 patent.

63. Printing Research lost its prospective purchase order with Hallmark as a result of Defendants' acquisition, and WPC's apparent ownership of, the '363 patent. Absent the '363 patent, it is more than reasonably probable that Printing Research would have entered into the contract with Hallmark for a purchase order.

64. Defendants were aware of Plaintiffs' prospective contract with Hallmark or were aware of facts and circumstance that would leave a reasonable person to believe in the existence of a prospective contract or business relationship. Nevertheless, Defendants have willfully refused to correct the inventorship of the '363 patent and have further aggravated the situation by filing and continuing to pursue approval for the Reissue Application.

65. Defendants' interference with Plaintiffs' prospective contract and business relationship with Hallmark has caused damage to Plaintiffs, including specifically by depriving Plaintiffs of profits that they would otherwise have received under the contract. Defendants' interference with Plaintiffs' prospective contracts and business relations is an ongoing tort preventing additional sales of Lithoflex® components and supplies to Hallmark and to other third parties.

66. The harm to Plaintiffs resulting from Defendants' tortious interference, as alleged above, resulted from malice. Accordingly, Plaintiffs ask that exemplary damages be awarded against the Defendants.

67. The harm to Plaintiffs resulting from Defendants' tortious interference, as alleged above, resulted from fraud. Accordingly, Plaintiffs ask that exemplary damages be awarded against the Defendants. Defendants' actions in obtaining the '363 patent, as alleged above, were fraudulent for at least the following reasons: (1) the acquisition of the '363 patent was accomplished through affirmative misrepresentations of the inventorship of the claimed methods and apparatus, made by Defendants to the PTO during the application for and prosecution of the '363 patent, with full knowledge of the inaccuracy of those statements and to the detriment of DeMoore and Rendleman, the actual inventors of the invention; (2) the '363 patent was obtained as a result of affirmative misrepresentations relied on by Plaintiffs to their detriment that the information conveyed by Plaintiffs to Defendants would not be disclosed; and (3) Defendants failed to tell Plaintiffs of the '097 application when, in light of their previous representations, Defendants had a legal duty to inform Plaintiffs. Defendants have further aggravated their conduct and its consequent damage to Plaintiffs by prosecuting the Reissue Application through further affirmative misrepresentations.

#### **COUNT V**

#### **BREACH OF CONTRACT**

68. Plaintiffs repeat the allegations of Paragraphs 11-67 above.

69. In 1995, and well prior to August 14, 1995, representatives of Printing Research and WPC agreed that, in exchange for the disclosure by Printing Research, to WPC, of the details

of Plaintiffs' Lithoflex® system and printer/coater units, WPC would maintain the confidentiality of those details.

70. Printing Research subsequently disclosed the details of Plaintiffs' Lithoflex® system and printer/coater units to WPC. Printing Research has fully performed its obligations under the agreement.

71. WPC breached the contract (and its position of trust and confidence) when Defendants surreptitiously filed the '097 patent application, thus disclosing the details of the Lithoflex® system and printer/coater units to the PTO, and ensuring the disclosure of the details to the public at large upon issuance of any patent therefrom. The details were disclosed to the public, in further breach of the agreement, by the issuance of the '363 patent on May 20, 1997.

72. As a result of WPC's breach of contract, Plaintiffs have suffered damages. In particular, Plaintiffs have suffered consequential damages, in that WPC's disclosure of the details to the PTO and the public has created a prior art reference which serves as a potential barrier against the acquisition of additional patent protection by Plaintiffs, the monetary value of which is to be determined at trial.

73. If it should be ultimately found that any one or more of the Defendants made a significant and inventive contribution to the invention described in the '363 patent or the Reissue Application, then that contribution should inure to the benefit of Printing Research.

#### COUNT VI

#### MISAPPROPRIATION OF TRADE SECRETS AND BREACH OF CONFIDENCE

74. Plaintiffs repeat the allegations of Paragraphs 11-73 above.

75. Plaintiffs possessed trade secrets and confidential information, which they disclosed to Defendants in confidence, under an express or implied agreement limiting use or

disclosure to the Defendants. Defendants used or disclosed Plaintiffs' trade secrets in breach of that confidence, without permission or privilege to do so, and by that use or disclosure damaged Plaintiff.

76. By their use or disclosure of Plaintiffs' trade secrets and confidential information, Defendants committed the torts of misappropriation of trade secrets and breach of confidence.

#### COUNT VII

#### ATTORNEYS' FEES

77. Plaintiffs repeat the allegations of Paragraphs 11-76 above.

78. This is an exceptional case within the meaning of 35 U.S.C. §285. Accordingly, Plaintiffs ask that they be awarded, and that Defendants be made to compensate Plaintiffs for, Plaintiffs' reasonable attorneys' fees.

79. This case involves a breach of contract. Accordingly, Plaintiffs ask that they be awarded, and that Defendants be made to compensate Plaintiffs for, Plaintiffs' reasonable attorneys' fees. Tex. Civ. Prac. & Rem. Code § 38.001.

#### PRAYER

WHEREFORE, Plaintiffs pray for the entry herein of a final judgment:

(a) correcting the inventorship of the '363 patent, pursuant to 35 U.S.C. §256, by removing Davis and Williamson as inventors of the invention of the '363 patent and naming DeMoore and Rendleman inventors of the claimed invention of the '363 patent or, in the alternative, by adding DeMoore and Rendleman as joint inventors of the claimed invention of the '363 patent;

(b) holding the '363 patent infringed by WPC;

(c) enjoining the Defendants, including WPC and its servants, agents, officers and employees and any and all persons acting by or under WPC's authority, or in privity therewith, from engaging in further acts of infringement of the '363 patent or from making, using, selling or offering to sell the invention described in the '363 patent;

(d) requiring WPC to account to Plaintiffs for any and all profits derived by WPC, and to compensate Plaintiffs under 35 U.S.C. §284 for all damages, including, without limit, reasonable royalties and lost profits, sustained by Plaintiffs, due to WPC's acts of infringement of the '363 patent, together with interest, and that such damages be trebled by reason of the willful and deliberate nature of WPC's infringement;

(e) requiring Defendants to pay the costs of this suit, including, as this is an exceptional case pursuant to 35 U.S.C. §285, Plaintiffs' reasonable attorneys' fees incurred in bringing and prosecuting its patent claims;

(f) requiring Defendants to compensate Plaintiffs for all damages sustained by Plaintiffs as a result of Defendants' conversion of Plaintiffs' rights to the invention claimed in the '363 patent, including pre- and post-judgment interest and exemplary damages, the amount of which are to be determined at trial;

(g) requiring Defendants to compensate Plaintiffs for all damages sustained by Plaintiffs as a result of Defendants' tortious interference with Plaintiffs' prospective business relations, including pre- and post-judgment interest and exemplary damages, the amount of which are to be determined at trial;

(h) requiring WPC to compensate Plaintiffs for all damages sustained by Plaintiffs as a result of WPC's breach of the Confidentiality Agreement, including pre- and post-judgment interest;

(i) requiring Defendants to compensate Plaintiffs for all damages sustained by Plaintiffs as a result of Defendants' misappropriation of trade secrets and breach of confidence;

(j) requiring Defendants to assign to Plaintiffs the '363 patent and such rights as may result from the Reissue Application;

(k) enjoining the Defendants, including WPC and its servants, agents, officers and employees and any and all persons acting by or under WPC's authority, or in privity therewith, from enforcing the '363 patent;

(l) requiring Defendants to account to Plaintiffs for any and all profits derived by Defendants from the manufacture, sale, or use of the invention described in the '363 patent, and to hold such profits in constructive trust for Plaintiffs;

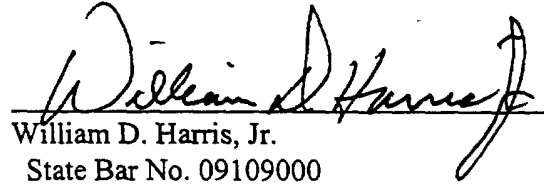
(m) enjoining the Defendants, including WPC and its assignees, servants, agents, officers and employees and any and all, persons acting by or under WPC's authority, or in privity therewith, from the further manufacture, sale, or use of the invention described in the '363 patent;

(n) awarding Plaintiffs exemplary damages, as allowed by Texas Civil Practice and Remedies Code, Title 2, Chapter 41, for those common law torts described herein committed by any of the Defendants. Tex. Civ. Prac. & Rem. Code §§ 41.001 et seq.

(o) that Plaintiffs be awarded all other such relief as may be allowed by law or at equity.

FILED: 09/11/00

Respectfully submitted:



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ATTORNEYS FOR PLAINTIFFS

**CERTIFICATE OF SERVICE**

I hereby certify that the foregoing "First Amended Original Complaint" was served on Defendants' counsel by certified mail, return receipt requested on September 11, 2000:

John P. Pinkerton

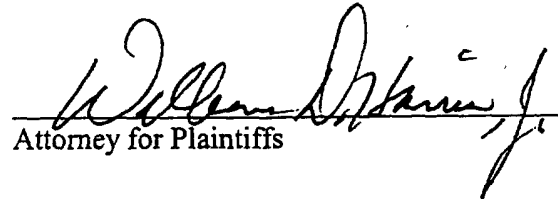
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Attorney for Plaintiffs

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US005630363A

## United States Patent [19]

Davis et al.

[11] Patent Number: 5,630,363

[45] Date of Patent: May 20, 1997

[54] COMBINED LITHOGRAPHIC/  
FLEXOGRAPHIC PRINTING APPARATUS  
AND PROCESS[75] Inventors: Bill L. Davis, Irving; Jesse S.  
Williamson, Dallas, both of Tex.[73] Assignee: Williamson Printing Corporation,  
Dallas, Tex.

[21] Appl. No.: 515,097

[22] Filed: Aug. 14, 1995

[51] Int. Cl.<sup>6</sup> B41M 1/18; B41M 7/00;  
B41M 1/04; B41F 23/00[52] U.S. Cl. 101/141; 101/181; 101/183;  
101/424.1; 101/424.2; 101/479; 101/483;  
101/491; 101/DIG. 49[58] Field of Search 101/135-138,  
101/141-143, 450.1, 174, 180, 181, 183,  
416.1, 424.1, 424.2, 479, 491, DIG. 29,  
DIG. 49, 483

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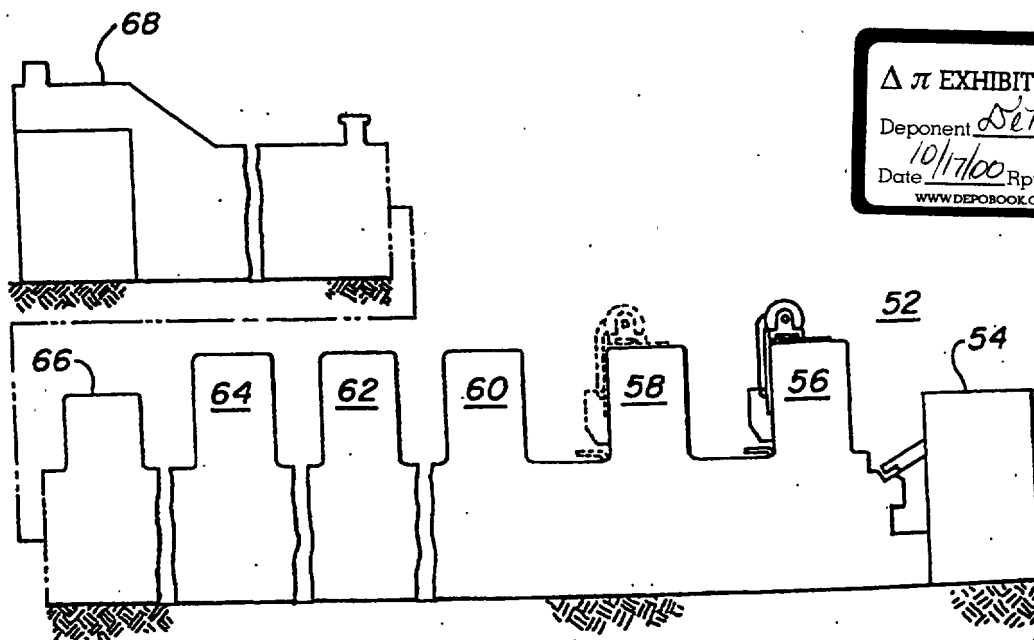
Primary Examiner—Stephen R. Funk  
Attorney, Agent, or Firm—Jones, Day, Reavis & Pogue

[57]

## ABSTRACT

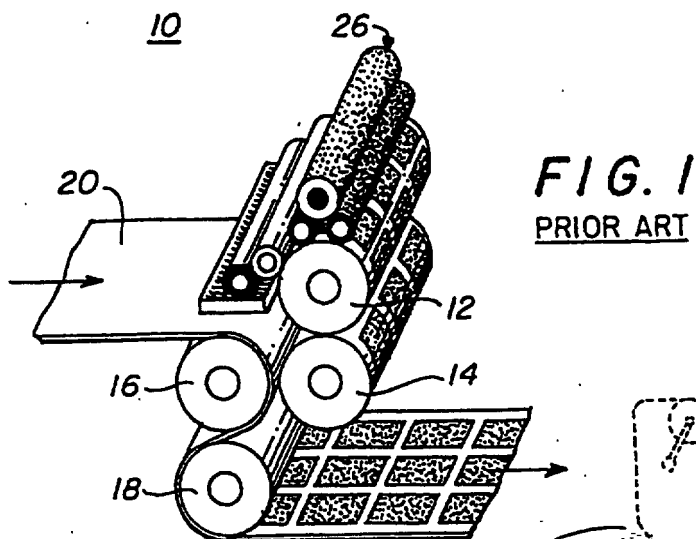
A combined lithographic/flexographic printing process having a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process. One of the stations prints a first color image using the flexographic process and at least one of the successive printing stations prints a second color image over the first color image using an offset lithographic process in the continuous in-line process.

41 Claims, 1 Drawing Sheet

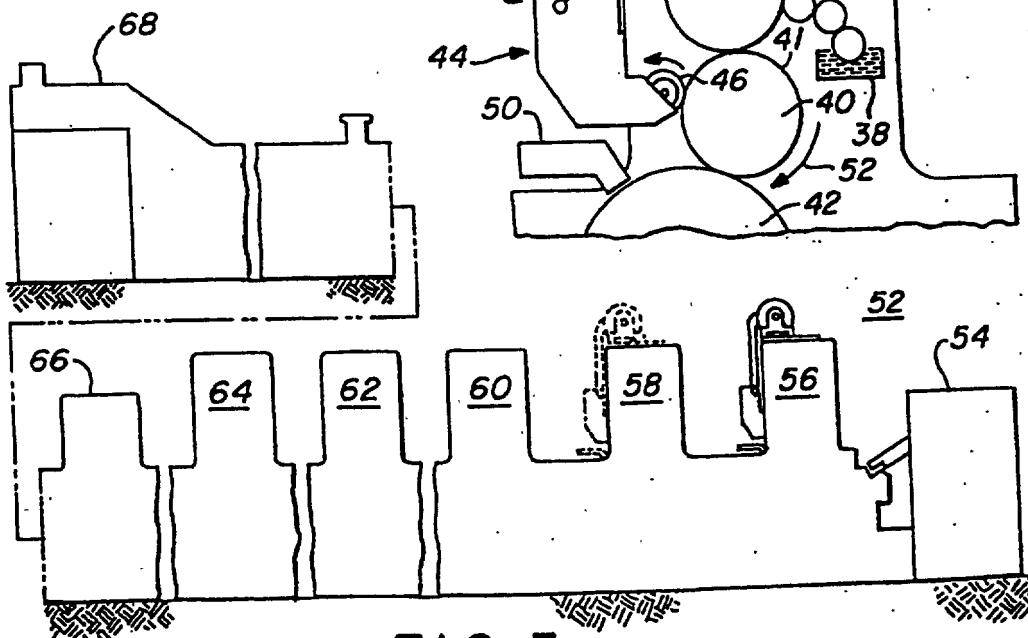
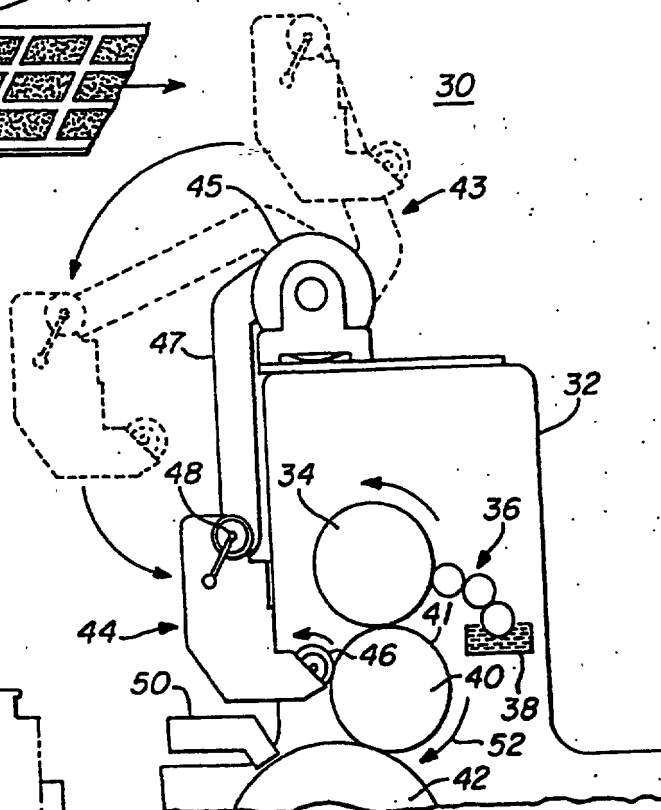


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**FIG. 2**



**FIG. 3**

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# COMBINED LITHOGRAPHIC/ FLEXOGRAPHIC PRINTING APPARATUS AND PROCESS

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

The present invention relates in general to printing machines and processes and in particular to a combined lithographic/flexographic in-line printing apparatus and process.

### 2. Description of Related Art

As used herein, the following terms have the meanings indicated:

#### ANILOX ROLLER

A steel or ceramic ink metering roller. Its surface is engraved with tiny, uniform cells that carry and deposit a thin, controlled layer of ink film or coating material onto the plate. In flexo presswork, anilox rollers transfer a controlled ink film from the rubber plate (or rubber-covered roller) to the web to print the image. Anilox rollers are also used in remoistenable glue units and to create "scratch-and-sniff" perfume ads.

#### ANILOX SYSTEM

The inking method commonly employed on flexographic presses. An elastomer-covered fountain roller supplies a controlled ink film from the ink pan to the engraved metering roller. After ink floods the metering roller, the fountain roller is squeezed or wiped usually with a doctor blade to remove the excess ink. The ink that remains on the metering roller is then transferred to the rubber printing plate.

#### COATER

A device with a pan to contain the coating material, a pan roller partially immersed in the coating material contained in the pan, and a coater roller to meter off a uniform film of the coating material and apply it to the printing plate.

#### COATING

An unbroken, clear film applied to a substrate in layers to protect and seal it, or to make it glossy.

#### FLEXOGRAPHIC INK

A quick-drying, fluid ink that is highly volatile or an ink that can be water based and nonvolatile.

#### FLEXOGRAPHY

A method of rotary letterpress printing characterized by the use of flexible, rubber, or plastic plates with raised image areas and fluid, rapid-drying inks.

#### HALFTONES

Dot-pattern images that have the appearance of continuous-tone images because of the limited resolving power of the human eye. This limitation accounts for an optical illusion; small halftone dots, when viewed at the normal reading distance, cannot be resolved as individual dots but blend into a continuous tone.

#### LITHOGRAPHIC PLATES

A lithographic plate is precoated with a light-sensitive or otherwise imageable coating, and the separation between the image and nonimage areas is maintained chemically. The image areas must be ink receptive and refuse water and the nonimage areas must be water receptive and refuse ink. The wider the difference maintained between the ink receptivity of the image areas and the water receptivity of the nonimage areas, the better the plate will be, the easier it will run on the press, and, consequently, the better the printing. There are several types of lithographic plates. The plate is an image carrier that is said to be planographic, or flat and smooth.

## LITHOGRAPHY

A printing process in which the image carrier or plate is chemically treated so that the image areas are receptive to ink.

### 5 OFFSET PRINTING

An indirect printing method in which the inked image on a press plate is first transferred to a rubber blanket, that in turn "offsets" the inked impression to a press sheet. In offset lithography, the printing plate has been photochemically treated to produce image areas receptive to ink.

#### SLURRY

A water suspension of fibers or the suspension of pigment and adhesive used to coat papers. It may also include a suspended metallic material such as uniform-sized metal particles or nonuniform-sized metal particles.

#### ULTRAVIOLET INKS

Printing inks containing an activator that causes the polymerization of binders and solvents after exposure to a source of ultraviolet radiation.

20 Offset lithography is a process that is well known in the art and utilizes the planographic method. This means that the image and nonprinting areas are essentially on the same plane of a thin metal plate and the distinction between them is maintained chemically. There are two basic differences between offset lithography and other processes. First, it is based on the principle that grease and water do not mix. Second, the ink is offset from the first plate to a rubber blanket and then from the blanket to a substrate on which printing is to occur such as paper.

30 When the printing plate is made, the printing image is made grease receptive and water repellant and the nonprinting areas are made water receptive and ink repellant. The plate is mounted on the plate cylinder of the press which, as it rotates, comes in contact successively with rollers wet by a water or dampening solution and rollers wet by ink. The dampening solution wets the nonprinting areas of the plate and prevents the ink from wetting these areas. The ink wets the image areas which are transferred to the intermediate blanket cylinder. The inked image is transferred to the substrate as it passes between the blanket cylinder and the impression cylinder. Transferring the image from the plate to a rubber blanket before transfer to the substrate is called the offset principle.

45 One major advantage of the offset principle is that the soft rubber surface of the blanket creates a clearer impression on a wide variety of paper surfaces and other substrate materials with both rough and smooth textures with a minimum of press preparation.

Offset lithography has equipment for short, medium and long runs. Both sheetfed and web presses are used. Sheetfed lithography is used for printing advertising, books, catalogs, greeting cards, posters, labels, packaging, folding boxes, decalcomanias, coupons, trading stamps, and art reproductions. Many sheetfed presses can perfect (print both sides of the paper) in one pass through the press. Web offset is used for printing business forms, newspapers, preprinted newspaper inserts, advertising literature, catalogs, long-run books, encyclopedias, and magazines.

In offset lithography, the rubber blanket surface conforms to irregular printing surfaces, resulting in the need for less pressure and preparation. It has improved print quality of text and halftones on rough surfaced papers. Further, the substrate does not contact the printing plate thereby increasing plate life and reducing abrasive wear. Also, the image on the plate is right for reading rather than reverse reading. Finally, less ink is required for equal coverage, drying is speeded, and smudging and setoff are reduced. Setoff is a

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condition that results when wet ink on the surface of the press sheets transfers or sticks to the backs of other sheets in the delivery pile.

Thus, in summary, conventional lithographic offset printing machines or presses comprise one or more image printing stations each having a printing roller or a plate cylinder to which is fastened a thin hydrophilic, oleophobic printing plate having image areas which are oleophilic and hydrophobic and background areas which are oleophobic and hydrophilic. The plate surface is continuously wetted with an aqueous damping solution which adheres only to the background areas and inked with oleo-resinous inks which adhere only to the image areas of the plate as wet ink. The ink is offset transferred to the rubber surface of a contacting blanket cylinder and then retransferred to the receptive surface of a copy web or a succession of copy sheets, such as paper, with an impression cylinder and the ink air dries by oxidation and curing after passing through a drying station.

It is also known to provide the printing machine with a downstream coating station having a blanket roller associated with a coating application unit for the application of an overall protective coating over the entire printed area of the copy sheets or web.

It is known to apply pattern coatings of protective composition by means of blanket rolls by cutting into the rubber surface of the blanket to create raised or relief surface areas which selectively receive the coating composition from the application roll for retransfer to selected areas of the copy sheets in form of pattern coatings. See U.S. Pat. No. 4,796, 556.

Lithographic inks are formulated to print from planographic surfaces which use the principle that grease and water do not mix. Lithographic inks are generally very strong in color value to compensate for the lesser amount applied. They are among the strongest of all inks. The average amount of ink transferred to the paper is about half that of letter press because of the double split of the ink film between the plate cylinder and the blanket cylinder and the blanket cylinder and the substrate on the impression cylinder.

Problems occur in the offset lithographic process when attempting to print certain colors such as white and in particular white on other colors such as yellow because the color white will be faint and not sufficiently strong. In such cases, the sheet or paper or substrate requiring the white ink usually has to be run through the same printer several times before the white becomes sufficiently strong.

Further, such colors are not generally printable in an offset lithographic printing process. This means that the sheets or substrate must be removed and transferred to a second type of machine using the flexographic process to apply greater amounts of ink in successive printing runs to achieve the desired print quality.

A like situation occurs with the printing of slurry-type materials such as "scratch-and-sniff" materials which is a liquid vehicle with a slurry containing an encapsulated essence. Such liquid vehicles, because of the nature of the slurry, must be printed with a flexographic process because the anilox roller can supply greater amounts of ink to the flexo plate on the plate cylinder.

Again, when a liquid vehicle with a slurry having suspended material therein such as metallic particles is to be printed, an offset lithographic process cannot be used without the mixing of the aqueous solution with metallic inks which cause a dulling of the image. Further, the above-mentioned double split of the ink film adds to the dulling of the image. Therefore, to achieve desired results, the printing must take place with a flexographic printing machine.

Thus, liquid opaque coatings or inks such as white colored ink, scratch-and-sniff vehicles, and slurries with metal particles do not achieve desired results when printed in an offset lithographic process and must be transferred from the offset lithographic in-line machines to a separate machine for printing in a separate run.

Such requirements not only hinder the speed of the printing process but also require additional time and thus increase the cost of the printing.

It would be advantageous to have a continuous in-line process in which not only offset lithographic printing could take place but in which, in the same in-line process, liquid printing vehicles including opaque coatings, such as white ink, and slurries containing encapsulated essences or metallic particles could also be printed and dried not only before the printing of the offset lithographic inks but also in which, after the liquid opaque coatings have been applied, an overcoating could be applied to the printed liquid vehicle image using the lithographic process in the continuous in-line process.

#### SUMMARY OF THE INVENTION

The present invention provides for a continuous in-line printing process having a plurality of successive printing stations for printing color images on a substrate. At least one of the stations prints a liquid vehicle image on a substrate with an opaque coating using the flexographic process and at least one of the successive printing stations printing a second color image over the liquid vehicle image on the printed substrate using the lithographic process in the continuous in-line process.

In the novel inventive system, a single in-line continuous printing process is used. One of the stations may print a liquid vehicle image on a substrate that contains a slurry with an encapsulated essence therein utilizing the flexographic process. Another one of the stations may apply an overcoating over the liquid vehicle image on the printed substrate using a lithographic process. Still another of the stations may print an aqueous-based vehicle image including a suspended metallic material therein using the flexographic process to form a metallic coating and thereafter at least one of the successive printing stations prints a color image over the aqueous-based vehicle image using the lithographic offset process in the continuous in-line process.

Whenever a station is used for flexographic printing, a flexographic plate image is placed on the blanket cylinder for receiving the liquid vehicle and transferring the liquid vehicle to the impression cylinder for printing. An anilox roller is associated with the flexographic plate for supplying the liquid vehicle which may be an aqueous-based vehicle.

In addition, in such case, a high-velocity air dryer is associated with the impression cylinder of one or more of the printing stations where the printing on the substrate is occurring to assist in drying the ink or liquid vehicle printed on the substrate while it is on or near the impression cylinder, before the substrate arrives at the next successive station for additional printing, or before printing occurs at the next successive station.

Thus, if a liquid vehicle such as white ink is to be printed, it is printed with a flexographic process which deposits a greater amount of ink on the substrate, the ink is dried with a high-velocity air dryer while the substrate is on or near the impression cylinder and prior to the substrate being received by the next successive station. If desired, at the next successive station the printing of the white liquid vehicle may again take place thus ensuring the desired intensity of

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whiteness on the substrate. Subsequently, at the next succeeding station a printing may take place on top of the white printing and such printing may continue at the remaining successive stations.

Thus, it is an object of the present invention to provide a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process and in which some of the stations print using the flexographic process and other of the stations print utilizing the offset lithographic process.

It is also an object of the present invention to print an aqueous-based vehicle image including a suspended metallic material therein using the flexographic process at one printing station and at least one successive printing station printing a color image over the aqueous-based vehicle image using a lithographic process in a continuous in-line process or placing an overcoating over the aqueous-based vehicle image using the flexographic process and then printing at successive stations using the lithographic process.

It is yet another object of the present invention to provide a continuous in-line printing process in which one of the stations prints a liquid vehicle image on the substrate with a slurry containing an encapsulated essence using the flexographic process and at least one of the successive printing stations applies an overcoating over the liquid vehicle image on the printed substrate using the offset lithographic process in a continuous in-line process.

#### BRIEF DESCRIPTION OF THE DRAWINGS

These and other features of the present invention will be more fully disclosed when taken in conjunction with the following DETAILED DESCRIPTION OF THE PRESENT INVENTION in which like numerals represent like elements and in which:

FIG. 1 is a schematic view of a prior art offset lithography printing station;

FIG. 2 is a generalized depiction of a printing station that may be used either as an offset lithographic station or a flexographic printing station and illustrates how the station may be converted from an offset lithographic station to a flexographic station; and

FIG. 3 illustrates the continuous in-line process of the present invention comprising a plurality of printing stations, each of which can be converted from an offset lithographic printing station to a flexographic printing station as well as a final coating station.

#### DETAILED DESCRIPTION OF THE PRESENT INVENTION

FIG. 1 is a schematic representation of a well-known offset lithography printing station 10 having a plate cylinder 12, a blanket cylinder 14, and an impression cylinder 16. The printing medium or substrate, such as paper 20 either in sheet form or web, is fed over the impression cylinder 16 in printing contact with the blanket cylinder 14 to receive the image and then passes over the paper transfer cylinder 18 with the image printed thereon. An inking system 26, well known in the art, transfers the ink from the ink supply to the plate cylinder 12. This is a typical offset lithography printing station.

As disclosed in U.S. Pat. No. 4,796,556, offset lithographic printing machines generally have a plurality of in-line liquid application stations at least one of which is an ink image printing station for printing lithographic ink images on to suitable receptive copy sheets. The final

downstream liquid application station is a coating application station for printing a protective and/or aesthetic coating over selected portions of or over the entire ink-image printed surface of the copy sheets and can also be used to print metallic coatings or slurry. As stated in U.S. Pat. No. 4,796,556, two liquid application stations are shown, the latter including a coating apparatus and the first station being a conventional offset image printing station. The coating application printing station is one that can be modified to convert it either permanently or intermittently to a coating station from an offset lithographic station.

Such a station is illustrated in FIG. 2 herein. The station 30 comprises a housing 32 which includes therein a plate cylinder 34 that is fed with an ink system of rollers 36 that take ink from an ink supply 38 and transfer it to the plate cylinder 34. A blanket cylinder 40 is in ink transfer relationship with the plate cylinder 34 and the impression cylinder 42 where the image is transferred to a substrate passing between blanket cylinder 40 and impression cylinder 42 as blanket cylinder 40 rotates in the direction of arrow 52. This is a conventional offset lithographic printing station. When it is desired to convert that station into a coater station, the coater apparatus 43 has a coater head 44 including a supply of liquid coating and an anilox roller 46 that can be moved such that it can be in contact with either the blanket cylinder 40 for direct printing or the plate cylinder 34 for offset printing. In this case, the ink rollers 36 for the lithographic system are removed from engagement with the plate cylinder 34 in a well-known manner. The coater unit 43 includes a motor device 45, an arm 47, and a pivotal connection 48 that connects the coater head 44 with the remainder of the assembly.

As stated previously, the offset lithographic machine of FIG. 2 is converted as shown therein to a coater that is used only in the last stage of an in-line printing process. It has not been able to be used in stages other than the last printing station because the ink that is placed on the blanket cylinder by means of an anilox roller is still wet when it arrives at the subsequent stations, thus causing smearing of the printed material and causing a general impossibility of printing other information thereon. However, applicant has modified the station shown in FIG. 2 by the addition of a high-velocity air dryer 50 that is associated with the impression cylinder 42 directly after the ink is transferred from the blanket cylinder to the substrate on the impression cylinder. Thus by using flexographic inks, or aqueous coatings which are naturally quick-drying inks, and the high-velocity air dryer 50 located at the point where the ink is applied to the substrate on the impression cylinder, the ink is sufficiently dried when it passes to the next station that further printing can take place on the printed substrate.

Thus, as shown in FIG. 3, a conventional in-line offset lithographic printing machine 52 is shown having an apparatus to feed paper into the said machine, referred to as a feeder 54, printing stations 56, 58, 60, 62, and 64 and a coating station 66. A delivery station 68 receives the printed material or substrates. Thus there are a plurality of successive printing stations 56, 58, 60, 62, and 64 for printing color images on the substrate in a continuous in-line process. Any one of the printing stations 56-64 can be modified as generally shown therein and as illustrated in FIG. 2 to print a first color image using the flexographic process. The succeeding printing stations can then print a second color image over the first color image using the lithographic process in the continuous in-line process. As illustrated in FIG. 2, the flexographic process printing station includes the blanket cylinder 40 and the impression cylinder 42. A

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flexographic plate 41 on the blanket cylinder 40 has an image thereon for receiving the first color from the anilox roller 46 and transferring that first color image to the impression cylinder 42 for printing on the substrate. The high-velocity air dryer 50 thus dries the flexographic ink on the substrate and passes the substrate to the subsequent printing station. Thus in FIG. 3, station 56 may be modified as generally shown therein and as illustrated in FIG. 2 and a flexographic ink can be printed thereon at station 56, dried by the high-velocity air dryer 50, and coupled to subsequent in-line stations 58-64 for further printing a second or more color images over the first color image using the offset lithographic process in a continuous in-line process. The flexographic printing station shown in FIG. 2 may print a liquid vehicle image on the substrate with a slurry containing an encapsulated essence. At least one of the successive printing stations 58-64 an overcoating may be applied over the liquid vehicle image on the printed substrate using the flexographic process in the continuous in-line process. The overcoating may be an aqueous overcoating, or an ultraviolet overcoating. In addition, the substrate may be a sheet or a web 20 as illustrated in FIG. 1 or it may be single sheet fed in the continuous in-line process from the stack sheets shown at 54 in FIG. 3.

Further, the modified flexographic printing station 30 shown in FIG. 2, as stated previously, may be any one of the stations 56-64 in FIG. 3, and as illustrated by stations 56 and 58, and may print an aqueous-based vehicle image including a suspended metallic material therein using the flexographic process to form a metallic coating. Again, after it is dried by the high-velocity air dryer 50, it may be passed to one of the successive printing stations for printing a color image over the aqueous-based vehicle image using the offset lithographic process in the continuous in-line process. The suspended material may include uniform-sized metal particles to form the metallic coating or it may include nonuniform or multiple-sized metal particles to form the metallic coating.

The present invention is especially useful when a liquid opaque coating must be printed such as a white color ink. In that case, it may be desirable to have both stations 56 and 58 modified as shown in FIG. 3 and as illustrated in detail in FIG. 2. In such case, the anilox roller 46 at each station delivers the white ink in the same pattern to the flexographic plate 41 on the blanket cylinder 40 for transfer to the substrate on the impression cylinder 42. As the substrate passes the high-velocity drying station 50, the ink is dried and the second station may again print the same white pattern on the substrate to increase the quality of the white ink appearance after it is applied to the substrate.

Thus, the station or stations that are converted to flexographic printing stations may have an ink-providing means 46 at the printing station for applying a flexographic ink to the blanket cylinder to form the image. A substrate receives the flexographic ink image transfer from the blanket cylinder and at least one subsequent printing station in the in-line process receives the image-printed substrate and prints an additional coated ink image on the substrate on top of the flexographic ink image using offset lithography. The additional colored ink images that can be printed on top of the flexographic ink images can be conventional lithographic inks or waterless inks.

Further, the colored ink images may be printed with halftone screening processes. The flexographic ink image and the colored ink images may also be printed in solids and/or halftone printing plates in sequence and in registry in successive printing stations to produce a multicolored image on the substrate. Further, the printing apparatus may include a sheetfed press or a web press.

In the present invention, at least one of the flexographic printing stations prints an image with liquid vehicle slurry containing an encapsulated essence. In another embodiment, at least one of the printing stations prints an image with a water-based liquid vehicle containing suspended particles that are either uniform or nonuniform in size. The suspended particles may be metallic particles up to substantially 16 microns in diameter.

The present invention may also use the metallic color printing process as disclosed in commonly assigned U.S. Pat. No. 5,370,976 incorporated herein by reference in its entirety.

In one aspect, the novelty of the present invention is to create a flexographic printing station that can be used at one of a plurality of printing stations in a continuous in-line process and in which, at a subsequent printing station, a lithographic process may be used to print over the liquid vehicle printed by the flexographic station.

Thus, there has been disclosed an apparatus for a combined lithographic/flexographic printing process that includes a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process and wherein one of the stations prints a first color image using the flexographic process and at least one of the successive printing stations prints a second color image over the first color image using the lithographic process in the continuous in-line process.

While the invention has been described in connection with a preferred embodiment, it is not intended to limit the scope of the invention to the particular form set forth, but, on the contrary, it is intended to cover such alternatives, modifications, and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

We claim:

1. Apparatus for a combined lithographic/flexographic printing process comprising:
  - a substrate;
  - a plurality of successive printing stations for printing color images on the substrate in a continuous in-line process;
  - one of said stations comprising a flexographic printing station for printing a liquid vehicle image on said substrate with a slurry containing an encapsulated essence using the flexographic process;
  - at least one of said successive printing stations being a lithographic printing station; and
  - an overcoating applied over the liquid vehicle image on the printed substrate at at least one of said successive lithographic printing stations using the lithographic process in said continuous in-line process.
2. Apparatus as in claim 1 wherein said overcoating is an aqueous overcoating.
3. Apparatus as in claim 1 wherein said overcoating is an ultraviolet ink overcoating.
4. Apparatus as in claim 1 wherein:
  - said substrate is a paper sheet; and
  - said apparatus includes a sheet feeder.
5. Apparatus as in claim 1 wherein:
  - said substrate is a web; and
  - said apparatus includes a web feeder.
6. Apparatus for a combined lithographic/flexographic printing process comprising:
  - a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process;

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one of said stations comprising a flexographic printing station printing an aqueous-based vehicle image using the flexographic process to form a metallic coating;  
a suspended metallic material being included in said aqueous-based vehicle image; and

at least one of the successive printing stations comprising an offset lithographic printing station printing a color image over the aqueous-based vehicle image using the offset lithographic process in said continuous in-line process.

7. Apparatus as in claim 6 wherein said suspended material includes uniform-sized metal particles to form said metallic coating.

8. Apparatus as in claim 6 wherein said suspended material includes nonuniform-sized metal particles to form said metallic coating.

9. Apparatus as in claim 6 further including: said flexographic printing station including a plate cylinder having a flexographic plate thereon, a blanket cylinder, and an impression cylinder;

a flexographic plate image transferred from said plate cylinder to said blanket cylinder, said image being formed of said metallic coating, said blanket cylinder transferring said metallic coating to said impression cylinder for printing said flexographic plate image on said substrate; and

an anilox roller associated with said flexographic plate for supplying said aqueous-based vehicle containing said suspended metallic material to said flexographic plate.

10. Apparatus for creating a combined lithographic/flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process;

one of said stations comprising a flexographic printing station for printing a first color image using the flexographic process; and

at least one of the successive printing stations comprising an offset lithographic printing station for printing a second color image over the first color image using the offset lithographic process in said continuous in-line process.

11. Apparatus as in claim 10 further including:

said flexographic printing station including a plate cylinder, a blanket cylinder, and an impression cylinder;

a flexographic plate on said plate cylinder;

an anilox roller associated with said flexographic plate for supplying a first color to said flexographic plate to form said first color image; and

said blanket cylinder receiving said first color image from said plate cylinder and transferring said first color image to said impression cylinder for printing on said substrate.

12. Apparatus for creating a combined lithographic/flexographic printing process comprising:

a substrate;

a plurality of successive printing stations for printing color images on the substrate in a continuous in-line process;

at least two successive ones of said printing stations being flexography stations and comprising:

(1) a supply of liquid coating;

(2) a plate cylinder associated with a blanket cylinder, said plate cylinder having a flexographic plate thereon;

(3) an anilox roller associated with said liquid supply coating and said plate cylinder for delivering said liquid coating to said flexographic plate to form an image for transfer to said blanket cylinder;

(4) an impression cylinder for receiving said liquid coating image transferred from said blanket cylinder and printing said image on said substrate, said at least two flexography stations printing the same liquid coating image in sequence and in superimposed relationship; and

at least one offset lithographic printing station for receiving said substrate and printing over said liquid coating image.

13. Apparatus as in claim 12 wherein said liquid coating image printed on said substrate is a white color ink.

14. Apparatus as in claim 12 further including an air dryer associated with each of said impression cylinders on said flexography stations, said air dryer having sufficient air velocity for drying said liquid coating before the substrate is transferred to the successive printing station in said continuous in-line process.

15. Apparatus for a combined lithographic/flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process, said printing stations including both lithographic and flexographic printing stations;

a blanket cylinder at at least a first one of said flexographic printing stations;

flexographic ink-providing means at said at least first one of said flexographic printing stations for applying a flexographic ink to said blanket cylinder to form an image;

a substrate for receiving said flexographic ink image transferred from said blanket cylinder; and

at least one subsequent lithographic printing station in said in-line process for receiving said image printed substrate and printing an additional colored ink image on said substrate on top of said flexographic ink image using offset lithography.

16. Apparatus as in claim 15 further comprising:

a plate cylinder at said at least first one of said flexographic stations;

a flexographic plate on said plate cylinder for receiving and transferring said flexographic ink to said blanket cylinder; and

said flexographic ink-providing means including a flexographic ink supply and an anilox roller associated with said flexographic ink supply for transferring said flexographic ink to said flexographic plate.

17. Apparatus for a combined lithographic/flexographic printing process for printing a multicolored image comprising:

a plurality of successive printing stations for printing color on a substrate in a continuous in-line process, said printing stations including both lithographic and flexographic printing stations;

at least one of said flexographic printing stations having:

(1) a plate cylinder and a blanket cylinder, said plate cylinder including a flexographic plate having an image thereon for transferring a flexographic color ink image to said blanket cylinder;

(2) an etched anilox roller for applying a flexographic color ink to said flexographic plate on said plate cylinder;

(3) an impression cylinder in ink-transfer relationship with said blanket cylinder for transferring said flexographic color ink image from said blanket cylinder to said substrate; and

at least one of said succeeding printing stations being a lithographic printing station using offset lithography for printing additional colored ink images on top of said flexographic ink image.

18. Apparatus as in claim 17 wherein said additional colored ink images are formed with lithographic inks.

19. Apparatus as in claim 17 wherein said colored ink images are formed with waterless inks.

20. Apparatus as in claim 17 further including an air dryer adjacent to said impression cylinder for drying the flexographic ink image transferred to said substrate before said additional colored ink images are printed thereon.

21. Apparatus as in claim 17 further including halftone printing plates for printing said colored ink images.

22. Apparatus as in claim 17 wherein said flexographic ink image and said colored ink images are printed as solid colors and/or with halftone printing plates in sequence and in registry in said successive printing stations to produce said multicolored image on said substrate.

23. Apparatus as in claim 17 wherein said printing apparatus includes a sheet-fed press.

24. Apparatus as in claim 17 wherein at least one of said flexographic printing stations prints said flexographic ink image with liquid vehicle slurry containing an encapsulated essence.

25. Apparatus as in claim 17 wherein at least one of said printing stations prints said flexographic ink image with a water-based liquid vehicle containing suspended particles.

26. Apparatus as in claim 25 wherein said suspended particles are uniform in size.

27. Apparatus as in claim 25 wherein said suspended particles are nonuniform in size.

28. Apparatus as in claim 25 wherein said suspended particles are metallic particles.

29. A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

providing a plurality of successive lithographic/flexographic printing stations for printing colored ink images on a substrate;

printing a flexographic ink image on said substrate at at least one of said flexographic stations;

transferring said printed substrate to at least one subsequent printing station in said continuous in-line process; and

printing colored ink images on top of said flexographic ink image at at least one of said subsequent lithographic printing stations with an offset lithographic process.

30. A method as in claim 29 further comprising the step of drying said flexographic ink image on said substrate with an air dryer prior to printing said colored ink images thereon.

31. A method as in claim 29 further including the step of printing a coating on top of said colored ink images at one of said plurality of subsequent printing stations.

32. A method as in claim 29 wherein said colored inks forming said colored ink images are waterless.

33. A method as in claim 29 wherein said colored inks forming said colored ink images are in a solvent-based liquid vehicle.

34. A method as in claim 29 further including the steps of: printing a slurry on said substrate at any of said printing stations in said continuous in-line process;

using an encapsulated essence in said slurry; and

printing an overcoating over said slurry at a subsequent printing station in said in-line process to protect said essence.

35. A method as in claim 34 further including the step of printing an aqueous-based coating over said slurry.

36. A method as in claim 34 further including the step of printing an ultraviolet coating over said slurry.

37. A method of combining offset lithography and flexographic printing in a continuous in-line process comprising the steps of:

providing a substrate;

applying a flexographic ink to a blanket cylinder in a pattern with a coating head at a first flexographic printing station;

transferring said pattern of flexographic ink from said blanket cylinder to the substrate; and

printing a waterless ink pattern over said flexographic ink pattern on said substrate at at least one subsequent offset lithographic printing station in said continuous in-line process.

38. A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

printing an aqueous-based vehicle image having suspended particles therein on a substrate at a first flexographic printing station;

transferring said image printed substrate to at least one additional printing station in said continuous in-line process; and

printing additional colored ink images on said printed substrate over said aqueous-based vehicle image in an offset lithographic process at said at least one additional printing station in said in-line process.

39. A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

(1) providing a plurality of successive printing stations for printing liquid vehicle images on a substrate in said in-line continuous process;

(2) utilizing an anilox roller to transfer a liquid ink as said liquid vehicle to a flexographic plate image at at least one of said printing stations;

(3) printing said liquid ink from said flexographic plate image to a substrate;

(4) transferring said printed substrate with said liquid ink image to a subsequent printing station in said in-line printing process;

(5) repeating steps (2)-(4) at subsequent printing stations in said in-line process to achieve a desired opacity ink image on said substrate; and

(6) printing an ink pattern over said flexographic ink image using an offset lithographic process.

40. A method as in claim 39 further including the step of additionally printing colored ink images over said liquid ink image on said substrate at subsequent ones of said printing stations in said in-line process.

41. A method as in claim 40 wherein said liquid ink is an opaque white color.

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PRI 01062



$\Delta \pi$  EXHIBIT 3  
Deponent De Moore  
Date 10/17/00 Rptr. xc  
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Page 1

know. It is unreasonable to expect Plaintiffs to offer sworn verification that any representations cover "all" facts "in detail" or to "identify all persons" having knowledge "including the facts known to each of them." The only way to completely and literally answer such interrogatories would be for Plaintiffs to conduct exhaustive depositions of their own employees, associates, and other witnesses and then produce transcripts of those depositions to Defendants—clearly an unreasonable, unduly burdensome, and effectively unenforceable request. *See, e.g., Stovall v. Gulf and South American Steamship Co.*, 30 F.R.D. 152, 154 (S.D. Tex. 1961) ("How can the court make enforceable orders with reference to 'all' of anything?"). Plaintiffs also object to such interrogatories to the extent that they duplicate other discovery requests or may be more reasonably addressed through other modes of discovery.

2. Plaintiffs object to every interrogatory in so far as it invades the trade secret privilege, the attorney-client privilege, the attorney work product doctrine, or any other applicable privilege or exemption.

3. Plaintiffs object to each interrogatory or portion thereof that involves an opinion or contention that relates to fact or the application of law to fact in so far as that interrogatory may be premature and better answered after designated discovery. *See* Fed R. Civ. P. 33(c).

4. Plaintiffs object to any instruction, definition, request or other device that attempts to expand Plaintiffs' discovery burden beyond that defined in Rules 26 and 33 of the Federal Rules of Civil Procedure.

B. General Objections to General Instructions

5. Plaintiffs object that the instruction to supplement responses within ten days exceeds the scope of the Federal Rules of Civil Procedure. In accordance with the Federal Rules of Civil Procedure, Plaintiffs will timely amend or supplement as practicable.

6. Plaintiffs object that the instruction to state what portions of the interrogatory Plaintiffs are unable to answer exceeds the requirements of the Federal Rules of Civil Procedure and may be unduly burdensome.

7. Plaintiffs object that the instructions regarding "identify, identity, and indentification" are unduly burdensome and seek information that may be duplicative of other discovery requests.

8. Plaintiffs object to the instruction in paragraph E on page 2 of the First Interrogatories in so far as compliance with the literal terms of the instruction may reveal the contents of privileged documents or communications. Plaintiffs further object that description of withheld items in more detail than that required by the Federal Rules of Civil Procedure is unduly burdensome. Documents, communications, or things withheld on the basis of privilege or as trial preparation material will be identified in a manner sufficient to comply with Rule 26(b)(5) (Claims of Privilege or Protection of Trial Preparation Materials).

9. Plaintiffs object that the instruction regarding Plaintiffs' election, if any, of Rule 33(d) procedures attempts to expand Plaintiffs obligations beyond the requirements of that rule. See Fed. R. Civ. P. 33 (d). Rule 33(d) does not require that Plaintiffs specify the source, author, recipients or date of preparation of documents. *Id.*

C. General Objections To Definitions

10. Plaintiffs object to the definition of "PRI" as unduly burdensome in scope and potentially embracing persons over whom no party to this action has control. Because the definitions of "Plaintiffs," "you" and "yours" are defined to embrace the definition of PRI, they are similarly defective.

11. Plaintiffs object to the definition of "DeMoore" as unduly burdensome in scope and potentially embracing persons over whom no party to this action has control. Because the definitions of "Plaintiffs," "you" and "yours" are defined to embrace the definition of DeMoore, they are similarly defective.

12. Plaintiffs object to any attempt to broaden the definition of "document" beyond the scope of Rule 34(a) or to circumvent the protection of privileges by broadening that definition. As one example, Plaintiffs will not produce "opinions of counsel" protected by the attorney-client privilege.

II. Objections and Responses to Interrogatories

INTERROGATORY NO. 1:

State in detail all of the facts and circumstances that you believe support your claim that DeMoore is the sole inventor of the claimed invention of the '363 patent, including, but not limited to, the date on which, and place where, DeMoore first conceived such invention, and identify all persons known to you having knowledge of such facts and circumstances, including the facts and circumstances known to each of such persons.

RESPONSE:

Plaintiffs object that the interrogatory is over broad, unduly burdensome and duplicative. Subject to and without waiver of these and the general objections, Plaintiffs respond as follows.

By or about December 31, 1994, and perhaps earlier, Howard DeMoore had conceived of the invention. Prior to this, between about October 25, 1994 and November 25, 1994, Howard DeMoore asked PRI employee Ronald Rendleman if he could make a flexo coater work between towers 1 & 2 on our in-house Heidelberg press. Rendleman presented a rough draft print to Howard DeMoore on or about December 31, 1994 for an interstation coater of the type to be used on a press of the same type as the Williamson LYL press. On that date, Rendleman made a drawing of same.

In addition to the dates described in Plaintiffs' Original Complaint, the following dates relate to conception:

- Between about October 28, 1994 and December 1994, PRI employees believed to be Steve Garner and John Bird took a PRI flexographically printed sampler over to show Jesse Williamson at Williamson Printing Corporation. Jesse Williamson exhibited interest in the concept. PRI already had IR dryers that are needed for the Lithoflex® process installed at Williamson Printing Corporation on one of their new Heidelberg multi-color presses.
- Between about October 28, 1994 and December 1994, Jesse Williamson agreed to a test demonstration to be done in PRI's shop to investigate the Lithoflex® process. The test was delayed until late December.
- On or about December 15, 1994, Bill Davis faxed a list of materials to be tested to John Bird.
- On or about December 16, 1994 PRI's Rendleman generated a drawing for an interstation flexographic coater using an inclined slide concept.
- On or about December 20, 21, and/or 22, 1994, PRI ran tests on PRI's in-house press.

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- On or about December 27, 1994, PRI reduced to drawing the concept for an "HRC" coater.
- On or about December 30, 1994, PRI's Rendleman produced a drawing of an HRC coater on a Heidelberg press.
- On or about January 25, 1995, PRI's Steve Baker wrote to Jesse Williamson proposing a Super Blue EZB blanket coater for Williamson's Heidelberg 102 CD LYL 6 color 40 inch press with extension and quoted a price.
- On or about January 27, 1995, Rendleman produced a drawing of the plate coater for Williamson's press and a plate and blanket coater also.
- On or about February 11, 1995, Howard DeMoore, Steve Garner, and John Bird met with Jesse Williamson and Bill Davis at Williamson regarding tests on the Heidelberg Speedmaster CD 6 color LYL press to be conducted on or about February 12, 1995.
- At the latest, a patent application relating to the invention was filed May 4, 1995. That application followed disclosures of the complete concept to patent attorney Dennis Griggs. Therefore, conception had to have occurred before May 4, 1995.

While Plaintiffs presently believe that Howard DeMoore is the sole inventor, the case may be made for joint inventorship where, in addition to DeMoore, one or more of the following would be joint inventors: John Bird, Jesse Williamson, and Bill Davis. Terry Britton was PRI's press operator during the December 1994 printing trials at PRI.

To the best of Plaintiffs knowledge, individuals identified above as employees of either corporate party may be contacted at the addresses of their respective employers. Except as follows:

John Bird
J.B. Machinery, Inc.
9 Sasqua Trail
Weston, Connecticut 06883
(203) 544-0101

Steve Garner
209 Mill Creek Road
Arlington, Texas 76010
(817) 265-8375

Dennis T. Griggs
Griggs & Johnston, LLP
Preston Road at LBJ Freeway North Dallas Bank Tower, Suite 1200
12900 Preston Road, LB-15
Dallas, Texas 75230-1328
Telephone: 972-458-2511
Fax: 972-458-2557
Email: griggs@connect.net

INTERROGATORY NO. 2:

In regard to your alternative claim that DeMoore is a co-inventor of the claimed invention of the '363 patent, (a) state in detail the factual and legal bases that you believe support this claim, (b) identify each co-inventor, including DeMoore, and state in detail the activities, and contributions to the claimed invention of the '363 patent, of each co-inventor, and (c) identify all persons known to you having knowledge of the matters inquired about in subparagraphs (a) and (b) hereof, including the facts known to each of such persons.

RESPONSE:

Plaintiffs object that the interrogatory is over broad, unduly burdensome and duplicative. Subject to and without waiver of these and the general objections, Plaintiffs respond as follows.

See Response to No. 1, which addresses the possibility of joint inventorship. Specific contributions cannot be identified now. Although Plaintiffs believe that Howard DeMoore is the sole inventor, the parties were working together, and their meetings and communications may have provided cross-pollination of all of the ideas, thus making the inventive contributions entirely joint. In addition to DeMoore, joint inventors from PRI, if any, would include John Bird and Ron Rendleman, and joint inventors from Williamson Printing, if any, would include Jesse Williamson and Bill Davis.

INTERROGATORY NO. 3:

State in detail all of the facts and circumstances concerning the first actual reduction to practice of the claimed invention of the '363 patent by DeMoore, PRI or any other person, including the date and location thereof, and identify all persons known to you having knowledge of such facts and circumstances, including the facts known to each of such persons.

RESPONSE:

Plaintiffs object that the interrogatory is vague, over broad, unduly burdensome, unreasonable and duplicative. Subject to and without waiver of these and the general objections, Plaintiffs respond as follows.

The first actual reduction to practice may have occurred February 12, 1995. Although any of the earlier tests, deliveries, installations and/or runs by PRI (as described above and in the Original Complaint and dated on or about October 1994, November 15, 1995, and December 6, 1995) may also be regarded as an "actual reduction to practice." At the latest, an actual reduction to practice occurred on December 6, 1995 in Defendants' plant.

It should be noted that as a result of the settlement of an earlier lawsuit between PRI and Williamson, Williamson had agreed to let PRI test out new developments on Williamson's printing equipment. It should be further noted that PRI gave Williamson the first interstation coater free of charge.

INTERROGATORY NO. 4:

State in detail all of the facts and circumstances concerning your claim that Defendants derived the claimed invention of the '363 patent from Plaintiffs, and identify all persons known to you having knowledge of such facts and circumstances, including the facts known to each of such persons.

RESPONSE:

Plaintiffs object that the interrogatory is over broad, unduly burdensome and duplicative. Subject to and without waiver of these and the general objections, Plaintiffs respond as follows.

Without first contacting PRI and unbeknownst to PRI, Williamson filed a patent application on the Lithoflex® invention in August 1995. This patent application (now U.S. Patent 5,630,363) contains the significant concepts. At least Bill Davis and Jesse Williamson (who are named on the patent application) have knowledge, as well as PRI's Howard DeMoore, Steve Garner, and John Bird. The facts are simply that, through working with PRI, the Defendants learned the significant concepts from PRI and secretly appropriated them for their own use.

INTERROGATORY NO. 5:

Identify all persons with whom DeMoore had any communications about the Lithoflex system during the period beginning on January 1, 1994 and ending on May 4, 1995, and state in detail the content of each such communication, including the date thereof.

RESPONSE:

Plaintiffs object that the interrogatory is over broad, unduly burdensome, unreasonable, vague, and duplicative. Subject to and without waiver of these and the general objections, Plaintiffs respond as follows.

Howard W. DeMoore undoubtedly talked to a large number of people in over a year and four months concerning aspects of Lithoflex®. These persons are believed to include Steve Garner, Ron Rendleman, Howard Secor, John Bird, each of the Defendants, and Jim Johnson (then of Williamson Printing Corporation).

INTERROGATORY NO. 6:

Identify all persons to whom any invention disclosures, written descriptions, drawings or other communications relating to the May 4, 1995 patent application were made or provided prior to the filing of such application, and identify all such invention disclosures, written descriptions, drawings and other communications, including the date thereof.

RESPONSE:

Plaintiffs object that the interrogatory is over broad, unduly burdensome, unreasonable, vague, and duplicative. Subject to and without waiver of these and the general objections, Plaintiffs respond as follows.

John Bird, Ron Rendleman, Howard DeMoore, and other PRI employees, patent attorney Dennis Griggs, Defendants Williamson and Davis and other Williamson Printing employees with whom they or PRI's personnel have interfaced.

INTERROGATORY NO. 7:

Identify all persons known to you having knowledge of any facts and circumstances on which the allegations in paragraphs 46-50 of the Original Complaint are made or based, and state in detail the facts and circumstances known to each of such persons.

RESPONSE:

Plaintiffs object that the interrogatory is over broad, unduly burdensome, unreasonable, vague, and duplicative. Subject to and without waiver of these and the general objections, Plaintiffs respond as follows.

Howard DeMoore, John Bird, Steve Garner, Ron Rendleman, Bill Davis, Jesse Williamson, and probably others have knowledge of certain facts and circumstances alleged in the Original Complaint pertaining to Defendants' conversion of Plaintiffs' property.

INTERROGATORY NO. 8:

Identify all persons known to you having knowledge of any facts and circumstances on which the allegations in paragraphs 52-58 of the Original Complaint are made or based, and state in detail the facts and circumstances known to each of such persons.

RESPONSE:

Plaintiffs object that the interrogatory is over broad, unduly burdensome, unreasonable, vague, and duplicative. Subject to and without waiver of these and the general objections, Plaintiffs respond as follows.

Jim Rasmussen was the primary contact with Hallmark and has knowledge of facts surrounding the Hallmark contract:

Jim Rasmussen
Hallmark Card, Inc.
Advancing Technologies Div. – MD 233
Technical Innovation and Development
P.O. Box 419580
Kansas City, MO 64141-6580
(816) 274-3898
FAX (816) 274-7367

Dave Douglas, Howard DeMoore, Steve Garner, and Ron Rendleman also have knowledge of the facts alleged in the Original Complaint pertaining to Defendants' tortious interference.

INTERROGATORY NO. 9:

In regard to the allegations of paragraphs 60-63 of the Original Complaint, (a) identify all persons having knowledge of facts relating to or evidencing such allegations, including the facts known to each of such persons, (b) identify the agreement or contract referred to in such allegations and, if it was oral, state in detail all of the facts and circumstances surrounding such

oral agreement or contract, and (c) state in detail the factual and legal bases that you believe support your allegation that WPC was in a position of trust and confidence with PRI.

RESPONSE:

Plaintiffs object that the interrogatory is over broad, unduly burdensome, unreasonable, vague, and duplicative. Subject to and without waiver of these and the general objections, Plaintiffs respond as follows.

All persons named in the Original Complaint are aware that PRI and DeMoore have a reputation for developing innovative equipment and supplies for the printing industry. All persons named in the Original Complaint are aware that such innovations are potentially lucrative and, as such, are not given away to potential customers, competitors, or the general public. All persons named in the Original Complaint are aware that when such innovations as are at issue here are shown to a prospective customer and identified as innovations, new developments, or developmental products there is an implied agreement or contract of confidentiality. All persons named in the Original Complaint are aware that some innovations are so obviously innovations that they need not be identified as such for professionals in the printing industry to understand that their disclosure is pursuant to an implied agreement or contract to maintain confidentiality of the innovative processes, equipment, or supplies disclosed. However, there was an oral understanding that the Lithoflex® process and specific details of the process and equipment were to be kept secret. PRI and Williamson Printing were supposed to be "partnering" on the development of this process and equipment; i.e., this was more than just a simple commercial transaction.

INTERROGATORY NO. 10:

Identify all persons who conceived, designed and developed PRI's retractable printer/coater, including a description of the activities performed by each such person.

RESPONSE:

Plaintiffs object that the interrogatory is over broad, unduly burdensome and duplicative. Subject to and without waiver of these and the general objections, Plaintiffs respond as follows.

See the Original Complaint and Response to Interrogatory No. 1.

INTERROGATORY NO. 11:

In regard to Plaintiffs' allegations in the Original Complaint that it has been damaged by the alleged acts of Defendants, (a) list and describe separately each such element of damage, (b) state the monetary amount of each such element of damage and describe how each such amount was calculated or determined, and (c) identify all persons having knowledge of such damages and how such amounts were calculated or determined.

RESPONSE:

Plaintiffs object that the interrogatory is over broad, unduly burdensome and duplicative. Additionally, Plaintiffs object that the interrogatory requests information that requires Plaintiff to speculate as to, for example, future damages as well as past and present damages that are necessarily speculative, though nonetheless real and actual. Plaintiffs further object that this interrogatory may be premature and best answered after further discovery. Finally, Plaintiffs object that Defendants themselves may be able to answer the interrogatory in that Defendants are in a better position to state what profits they have made to date off the invention. Subject to and without waiver of these and the general objections, Plaintiffs respond as follows.

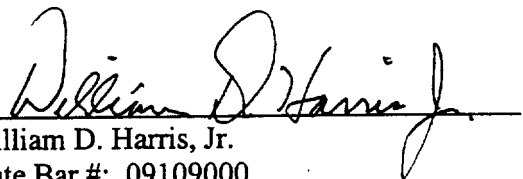
Plaintiffs know that they were damaged by loss of the Hallmark contract cited in the Original Complaint. That single contract had a stated dollar value of at least \$130,000.00.

Further, Hallmark has many, many printing locations nationwide, and Plaintiffs reasonably believe that some portion, if not all, of those locations may also have contracted for the system developed by Plaintiffs. Plaintiffs believe that at least two or three additional Lithoflex® coaters would likely have been sold to Hallmark or its designees. In addition, the sales of the Lithoflex® coaters would have included ancillary dryers and peripheral equipment. As to the open market, Plaintiffs do not know their damages because Plaintiffs have been afraid to market the invention for fear of liability to WPI.

Plaintiffs consider Defendants' profits to date from exploitation of the invention to be one partial measure of damages.

Plaintiffs have also lost the valuable services of longtime PRI executive Steve Garner who was unable to sell coaters because of Williamson's unlawful activities.

Respectfully submitted,



William D. Harris, Jr.
State Bar #: 09109000
L. Dan Tucker
State Bar #: 20276500
Robert T. Mowrey
State Bar #: 14607500
LOCKE LIDDELL & SAPP LLP
2200 Ross Avenue, Suite 2200
Dallas, Texas 75201-6776

ATTORNEYS FOR PLAINTIFFS

VERIFICATION

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared Dave Douglas, who is personally known to me. After I administered an oath to him, he swore upon his oath as follows

1. My name is Dave Douglas. I am over the age of twenty-one (21) years, competent to make this affidavit, and have personal knowledge of the matters set for the below.

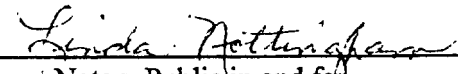
2. I am a vice president of Printing Research, Inc. I am authorized to make this affidavit on behalf of Printing Research, Inc. I have read the foregoing answers in "Plaintiffs' Response to Defendants First Set of Interrogatories." A reasonably diligent investigation has been made to compile information with which to answer these interrogatories, and the information set forth in the foregoing answers constitutes the best information available to Printing Research, Inc. Based on the information currently available after reasonable investigation, these answers are true and correct.

3. Answers explicitly stating my personal knowledge or that I have personal knowledge of facts are within my personal knowledge and are true and correct.



Dave Douglas

SUBSCRIBED AND SWORN TO before me, the undersigned authority, this 19th day of April 2000.



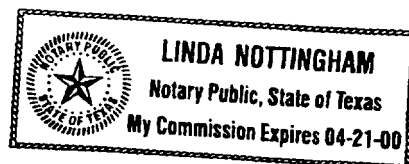
Notary Public in and for
The State of Texas

My Commission expires:

4/21/02

LINDA NOTTINGHAM

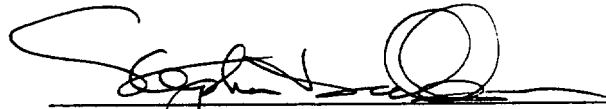
[Printed Name of Notary]



CERTIFICATE OF SERVICE

I hereby certify that the foregoing PLAINTIFFS' RESPONSE TO DEFENDANTS' FIRST SET OF INTERROGATORIES was served on Defendants' counsel by HAND DELIVERY to the undersigned counsel for Defendants on April 20, 2000:

John P. Pinkerton
WORSHAM, FORSYTHE & WOOLDRIDGE, L.L.P.
1601 Bryan, 30th Floor
Dallas, Texas 75201
FAX 214-969-5100



Stephen D. Wilson
Texas Bar No. 24003187

FILED

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$\Delta \pi$ EXHIBIT	4
Deponent	DeMoore
Date	10/17/00
Prtr.	JC
WWW.DEPOBOOK.COM	

Mr. Jerry Williamson
Williamson Printing Corp.
6700 Denton Dr.
Dallas, TX 75235-4497

Feb. 2, 2000

Dear Jerry,

I am writing to you personally in the hope that we may be able to agree to a fair settlement regarding our differences over PRI's participation in the development of the process and apparatus described in your US patent # 5,630,363 filed Aug. 14, 1995 and subsequently issued on May 20, 1997, which incidentally utilized illustrations which depicted the PRI EZB as was installed on the WPC press and which PRI had used in their DRUPA brochure printed in April, 1995.

It is well documented that PRI began discussions with Williamson Printing Corp. (WPC) in the fall of 1994 on the ability of utilizing our then named EZB coater originally patented Jan. '93, to apply metallics and other aqueous flexo materials as an in-line process on a litho press. We demonstrated this to Jesse Williamson, Bill Davis, Bob Emrick and Jim Johnson in our facility on Dec. 20-21, 1994 on PRI's 2/c Speedmaster equipped with the EZB with the stated goal of applying various flexo type inks, followed by overprinting with conventional litho ink in-line. (see attachment 1). These tests were scheduled as a direct result of interest generated by samples of metallic gold that were shown to Jesse Williamson by Steve Garner several months prior to this scheduled demo. The results of the demo were successful in that Jesse requested a proposal to adapt an EZB coater to a print unit of WPC's new 102 CD L-Y-L. (see attachment 2, proposal dated Jan. 25, 1995). Discussions followed regarding a "partnering" relationship in which both WPC and PRI would mutually share information gained as a result of the on-going developmental testing of both the process and the apparatus. Thus, beginning in Feb. '95, in addition to supplying the original metallic inks (from Eckert, Germany), PRI proceeded to install an EZB at no-charge to WPC with the objective of being operational prior to DRUPA in May '95 for the promotional value of both companies. This project was successfully completed as scheduled. Even though this first EZB (soon to be re-named the Lithoflex) was installed on an "L" unit, both WPC and PRI were interested in the installation of the EZB on the first print unit for in-line overprinting. In fact, the original interstation version of the EZB was initially installed on the 1st print unit of PRI's R&D press in Oct. '95, removed, and re-installed on WPC's press 1st unit in Nov. '95, as a time saving measure. The recent addition of PRI's patented interstation dryers on the WPC Press had made the adaptation of the flexo EZB possible on any print unit, which was, of course, the original intent from the beginning of our discussions months before with Jesse and Bill Davis.

From Feb. 16, 1995 until Dec. 6, 1995, the start-up date of the EZ Interstation coater, PRI invested the efforts of 39 engineers, production personnel, technicians, and other staff in a dedicated and cooperative crash program to develop the system. In this regard, WPC and PRI were in frequent discussions on a "Letter of Agreement and Understanding" that would give exclusivity to WPC for a specified time in certain markets, during which PRI could not deliver any Lithoflex systems. This was described in your letter of Aug. 11, 1995 (see attachment 3).

Jerry, had PRI known of WPC's intention during this time to file for a patent on both the apparatus and process, with no recognition of the extensive contributions of PRI, we would not have invested our

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PRI 00528

valuable talent, time and money in a project that represented no possibility of a return on this investment and no opportunity to practice our invention.

That brings me to the point of one of our original discussions in which I proposed that PRI be added to the 5,630,363 patent as co-inventor. This would not weaken WPC's position in the least and would allow PRI the opportunity to sell the apparatus in the fashion in which it was originally conceived. This could be accomplished under patent law without any cost to WPC whatsoever and would seem a fair and equitable solution to this ongoing dilemma.

It has been determined that PRI's developmental costs of the Lithoflex are over \$680,000.00, and with ongoing legal expenses estimated to be at least this much, if not more, our lawyers could easily purchase three Rolls Royces (at \$217,000.00 plus each) and have money left over for a nice vacation. Your company's expenditures have likewise been substantial and in light of this, I sincerely hope that we can reach a mutually satisfactory arrangement and put our company's money and energy to more productive causes.

I am looking forward to discussing this with you personally in the near future.

Sincerely Yours,

Howard DeMoore

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PRI 00529

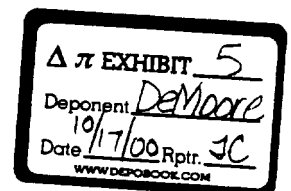
[illegible]

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Exhibit 5

Redacted

(PRI 01641 - 01667)



6

01668-01685

Exhibit 6 is
(PRI 01668-01685) redacted,
except for 01672-01673

$\Delta \pi$ EXHIBIT <u>6</u>	
Deponent	<u>DeMone</u>
Date	<u>10/17/00</u> Rptr. <u>JC</u>
<small>WWW.DEPONCOOL.COM</small>	

GLASER, GRIGGS & SCHWARTZ
Attorneys at Law

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Three Lincoln Centre
5430 LBJ Freeway, Suite 1540
Dallas, Texas 75240

(214) 770-2400

STATEMENT

Printing Research, Inc.
Statement No. 27120-00000-155 DTG

Total services for this matter \$ 125.00

B5841 INFRARED HOT AIR DRYER AND EXTRACTOR

07/07/94

Prosecution of U.S. Patent Application Serial No. 08/116,711. Office conference at Printing Research with Mr. Ron Rendleman. Review engineering drawings. Review prototype test report. Consultation regarding actual reduction to practice.

Total services for this matter \$ 450.00

B5716KR COATING APPARATUS FOR SHEET-FED, OFFSET
ROTARY PRINTING PRESSES

07/14/94

Prosecution of Korean Patent Application No. 1993-7412. Attending to correspondence from Korean associate. Review publication document for Korean patent application. Letter with publication document to Mr. Ed Schaffler with advice regarding publication of patent application in Korea.

Total services for this matter \$ 75.00

B5900 OFFSET LITHOGRAPHY UTILIZING AQUEOUS INK

PRI 01672

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STATEMENT

Printing Research, Inc.

Statement No. 27120-00000-155 DTG

07/07/94 Office conference with Mr. Howard DeMoore and Mr. John Bird. Comprehensive review of specification, claims and drawings. Office conference with professional illustrator regarding revision to patent drawings.

07/08/94 Revise specification, claims and drawings. Office conference at Printing Research with Mr. Howard DeMoore, Mr. John Bird and Mr. Steve Garner.

07/11/94 Revise specification. Prepare additional drawing figures. Office conference at Printing Research with Mr. Howard DeMoore, Mr. John Bird and Mr. Steve Garner. Comprehensive review of patent specification, claims and drawings.

07/12/94 Continuation of work-in-progress. Prepare patent claims for rotary offset press and web press embodiments.

07/13/94 Revise specification and claims. Office conference at Printing Research with Mr. Howard DeMoore and Mr. John Bird.

07/22/94 Prepare additional specification for newspaper web press and printing forms web press embodiments. Office conference at Printing Research with Mr. Howard DeMoore, Mr. John Bird and Mr. James Garner. Comprehensive review of specification, claims and drawings.

07/25/94 Revise specification, claims and drawings. Disclosure review conference at Printing Research with Mr. Howard DeMoore and Mr. Steve Garner.

07/27/94 Continuation of work-in-progress. Prepare additional specification for alternative embodiments. Revise specification and drawings. Office conference with professional illustrator regarding preparation of FIGURE 8 and FIGURE 9 embodiments. Office conference at Printing Research with Mr. Howard DeMoore.

PRI 01673

1997-1998		1998-1999		1999-2000		2000-2001		2001-2002		2002-2003		2003-2004		2004-2005		2005-2006		2006-2007		2007-2008		2008-2009		2009-2010		2010-2011		2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017		2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2023-2024		2024-2025		2025-2026		2026-2027		2027-2028		2028-2029		2029-2030		2030-2031		2031-2032		2032-2033		2033-2034		2034-2035		2035-2036		2036-2037		2037-2038		2038-2039		2039-2040		2040-2041		2041-2042		2042-2043		2043-2044		2044-2045		2045-2046		2046-2047		2047-2048		2048-2049		2049-2050		2050-2051		2051-2052		2052-2053		2053-2054		2054-2055		2055-2056		2056-2057		2057-2058		2058-2059		2059-2060		2060-2061		2061-2062		2062-2063		2063-2064		2064-2065		2065-2066		2066-2067		2067-2068		2068-2069		2069-2070		2070-2071		2071-2072		2072-2073		2073-2074		2074-2075		2075-2076		2076-2077		2077-2078		2078-2079		2079-2080		2080-2081		2081-2082		2082-2083		2083-2084		2084-2085		2085-2086		2086-2087		2087-2088		2088-2089		2089-2090		2090-2091		2091-2092		2092-2093		2093-2094		2094-2095		2095-2096		2096-2097		2097-2098		2098-2099		2099-2100		2100-2101		2101-2102		2102-2103		2103-2104		2104-2105		2105-2106		2106-2107		2107-2108		2108-2109		2109-2110		2110-2111		2111-2112		2112-2113		2113-2114		2114-2115		2115-2116		2116-2117		2117-2118		2118-2119		2119-2120		2120-2121		2121-2122		2122-2123		2123-2124		2124-2125		2125-2126		2126-2127		2127-2128		2128-2129		2129-2130		2130-2131		2131-2132		2132-2133		2133-2134		2134-2135		2135-2136		2136-2137		2137-2138		2138-2139		2139-2140		2140-2141		2141-2142		2142-2143		2143-2144		2144-2145		2145-2146		2146-2147		2147-2148		2148-2149		2149-2150		2150-2151		2151-2152		2152-2153		2153-2154		2154-2155		2155-2156		2156-2157		2157-2158		2158-2159		2159-2160		2160-2161		2161-2162		2162-2163		2163-2164		2164-2165		2165-2166		2166-2167		2167-2168		2168-2169		2169-2170		2170-2171		2171-2172		2172-2173		2173-2174		2174-2175		2175-2176		2176-2177		2177-2178		2178-2179		2179-2180		2180-2181		2181-2182		2182-2183		2183-2184		2184-2185		2185-2186		2186-2187		2187-2188		2188-2189		2189-2190		2190-2191		2191-2192		2192-2193		2193-2194		2194-2195		2195-2196		2196-2197		2197-2198		2198-2199		2199-2200		2200-2201		2201-2202		2202-2203		2203-2204		2204-2205		2205-2206		2206-2207		2207-2208		2208-2209		2209-2210		2210-2211		2211-2212		2212-2213		2213-2214		2214-2215		2215-2216		2216-2217		2217-2218		2218-2219		2219-2220		2220-2221		2221-2222		2222-2223		2223-2224	
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United States Patent [19]

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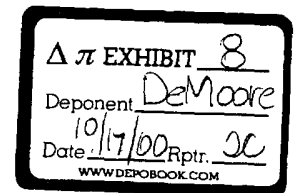
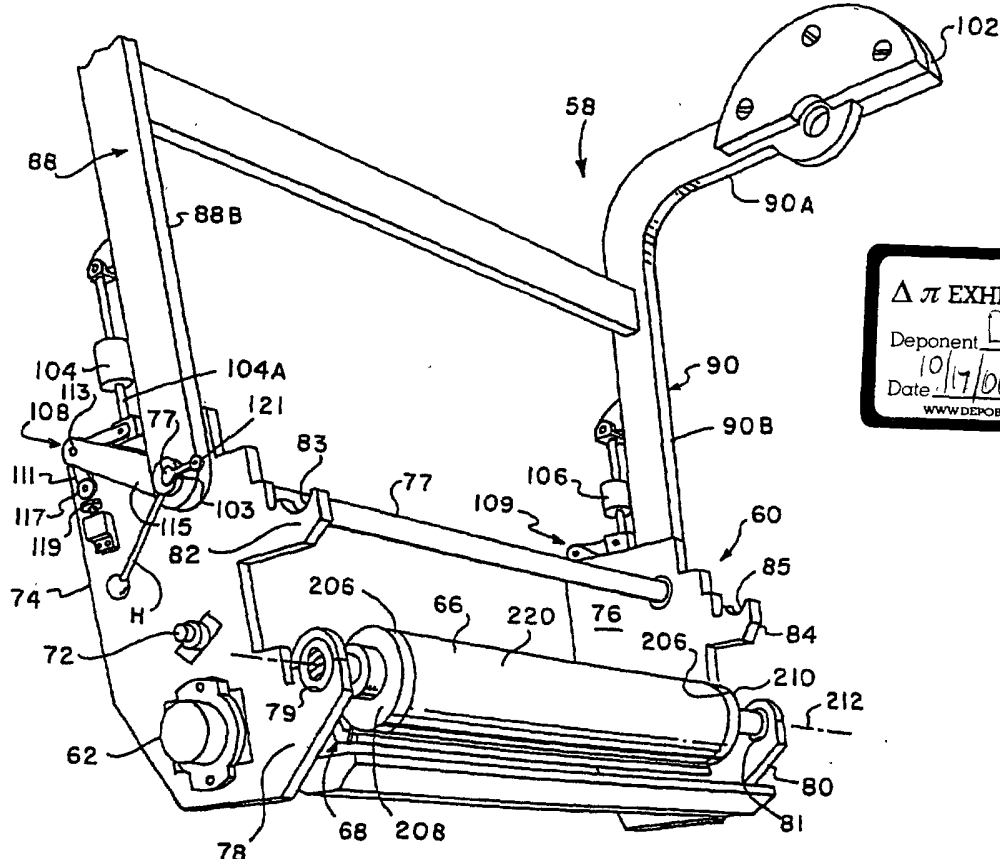
[11] Patent Number: **6,082,257**[45] Date of Patent: **Jul. 4, 2000**[54] **PRINTING UNIT WITH ANILOX ROLLER
BEARER POSITIONING**[75] Inventor: **Howard C. Secor, Krum, Tex.**[73] Assignee: **Howard W. DeMoore, Dallas, Tex.**[21] Appl. No.: **09/136,860**[22] Filed: **Aug. 19, 1998**[51] Int. Cl.⁷ **B41F 11/08**[52] U.S. Cl. **101/137; 101/185; 101/350.3;
101/351.1; 101/352.01; 118/259**[58] Field of Search **101/348, 350.1,
101/350.2, 350.3, 350.4, 351.1-351.4, 352.01-352.05,
137, 139, 140, 182, 184, 185, 192, 218;
118/259, 261**[56] **References Cited****U.S. PATENT DOCUMENTS**

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*Primary Examiner—John Hiltten**Assistant Examiner—Dave A. Ghatt**Attorney, Agent, or Firm—Locke Liddell & Sapp LLP*[57] **ABSTRACT**

A printing unit is disclosed which incorporates an applicator roller (66) such as anilox roller with bearer surfaces (206) at the ends thereof for positively positioning the applicator roller relative a cylinder, such as a plate cylinder (32) or a blanket cylinder (34). The bearer surfaces (206) on the applicator roller are engaged with the bearer surfaces (202, 204) of the plate or impression cylinder to precisely and consistently position the applicator roller (66) relative the cylinder.

8 Claims, 6 Drawing Sheets

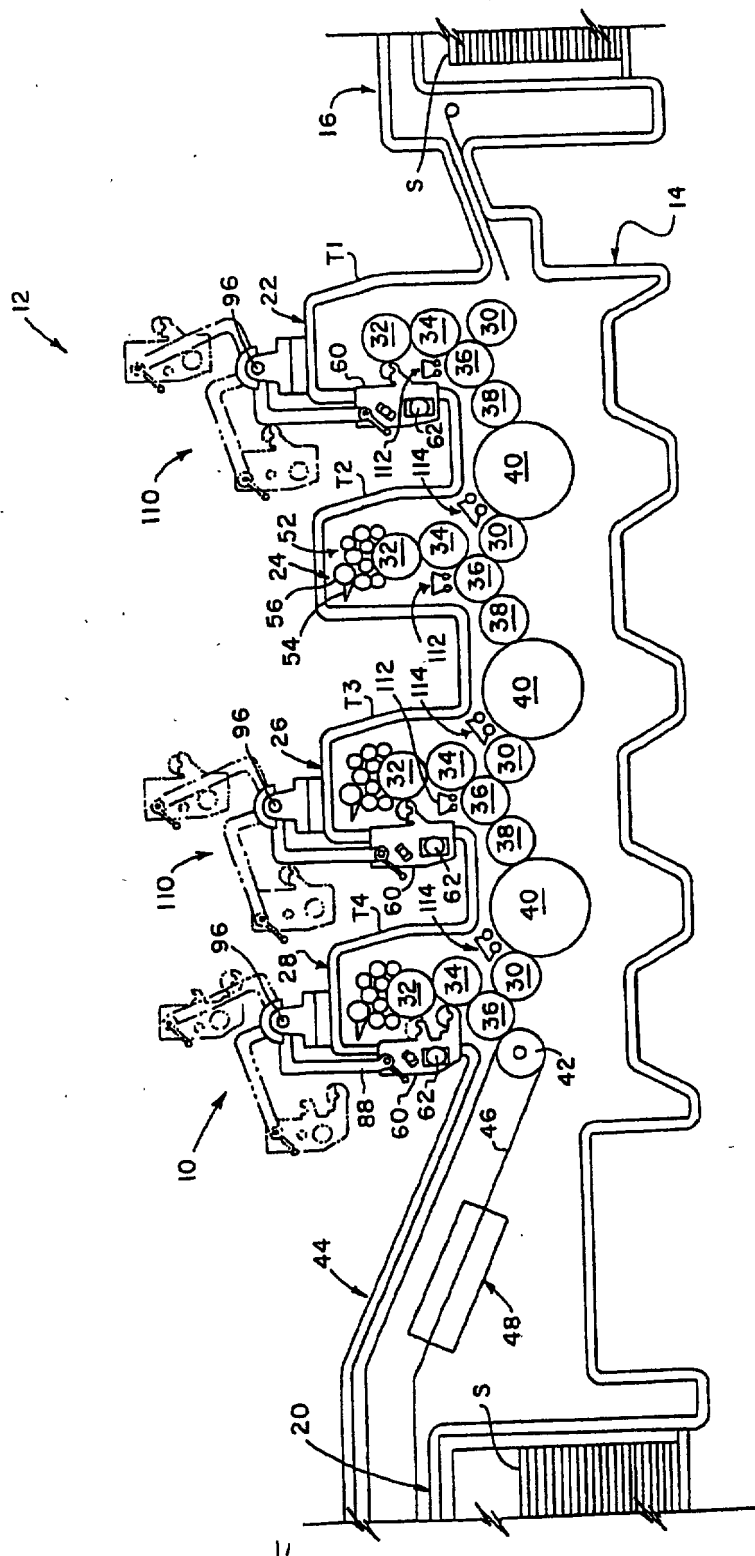
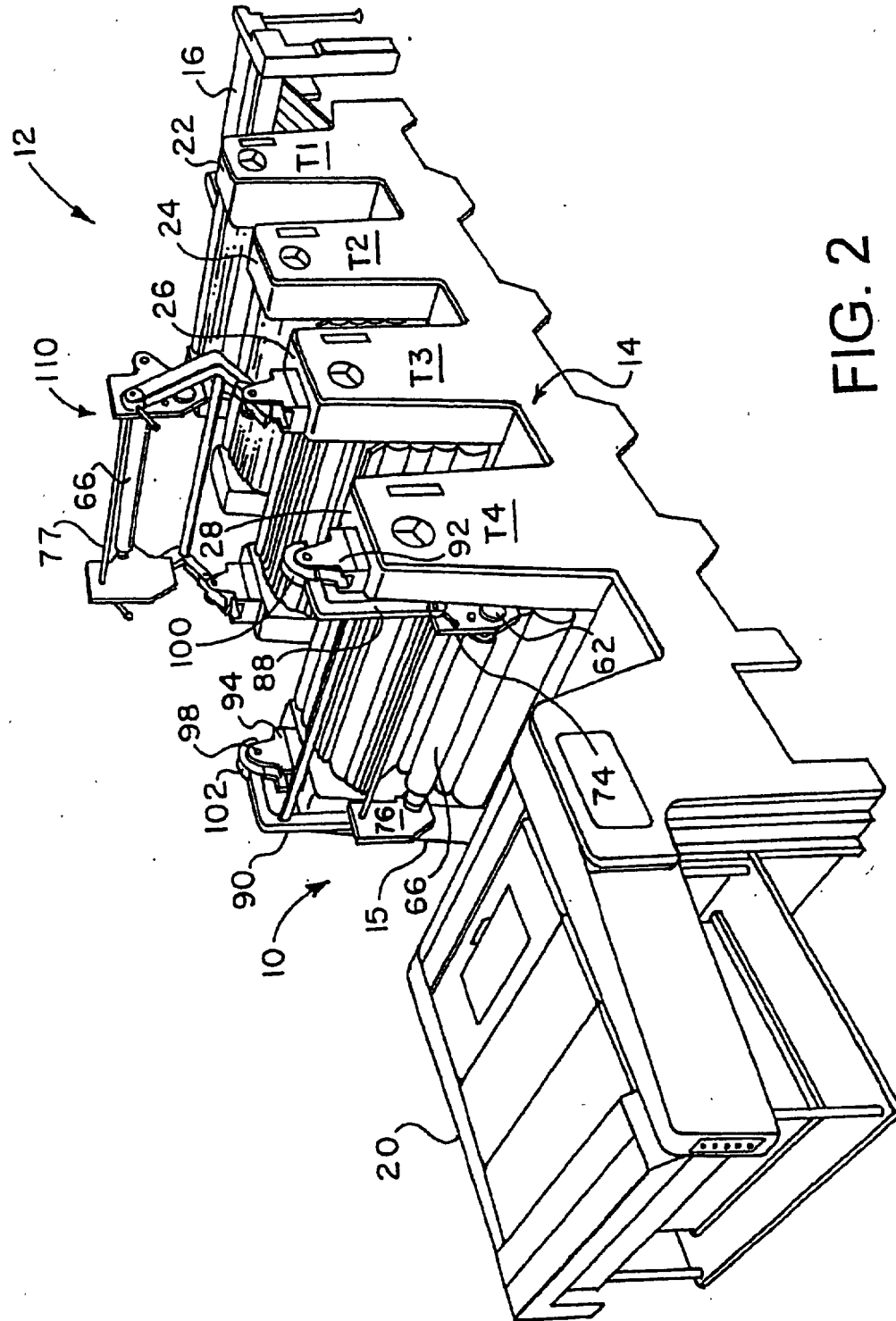
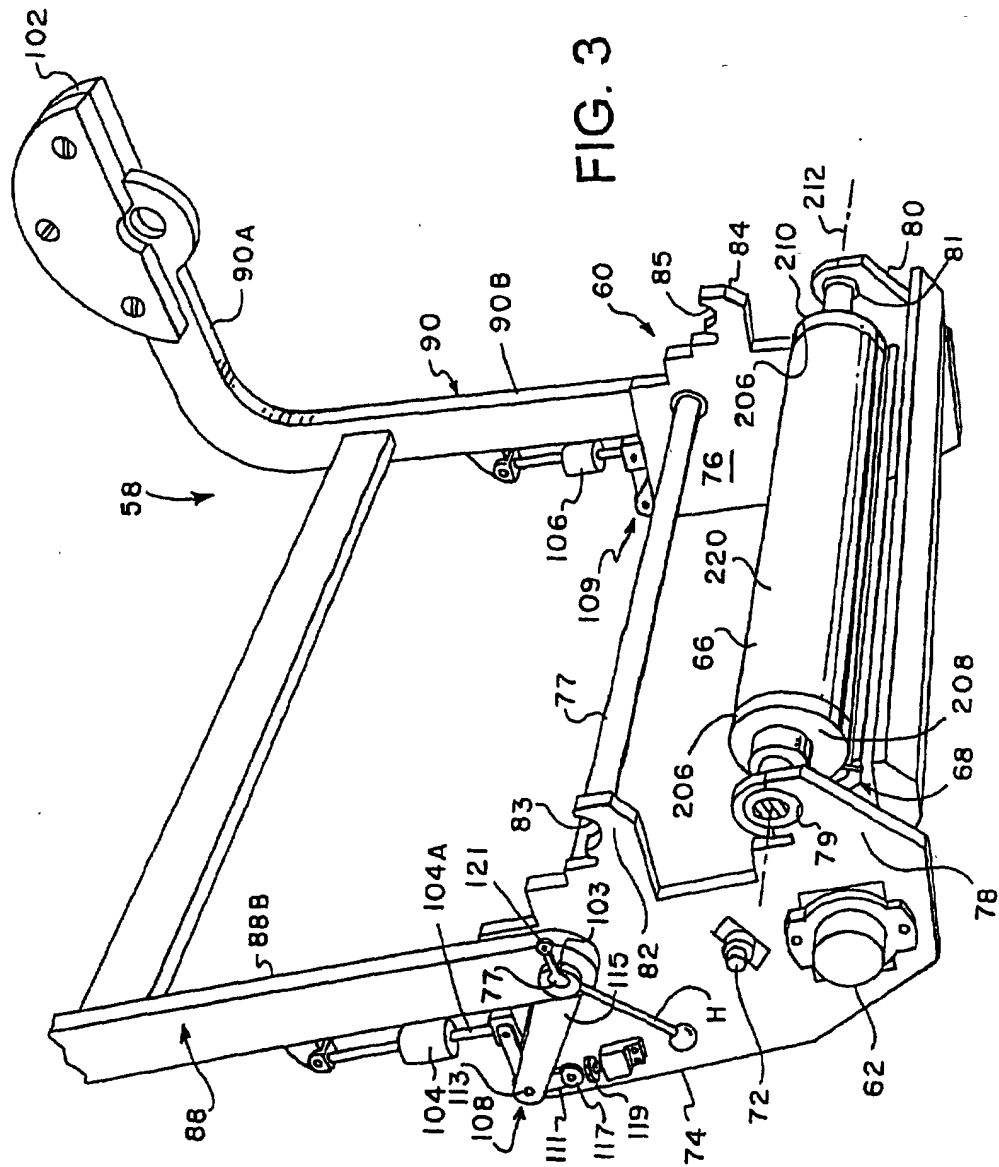


FIG. 1

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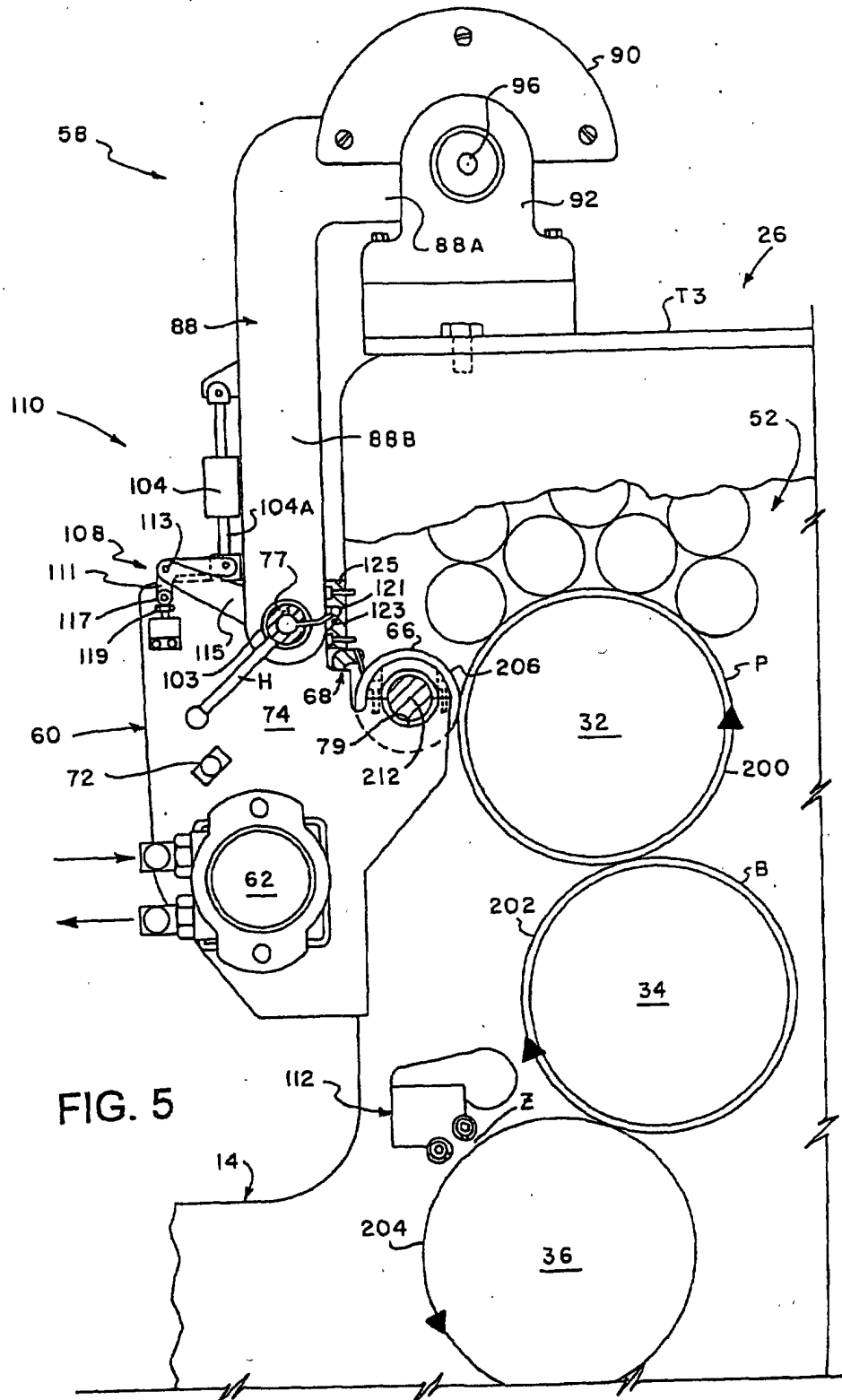


FIG. 5

FIG. 6

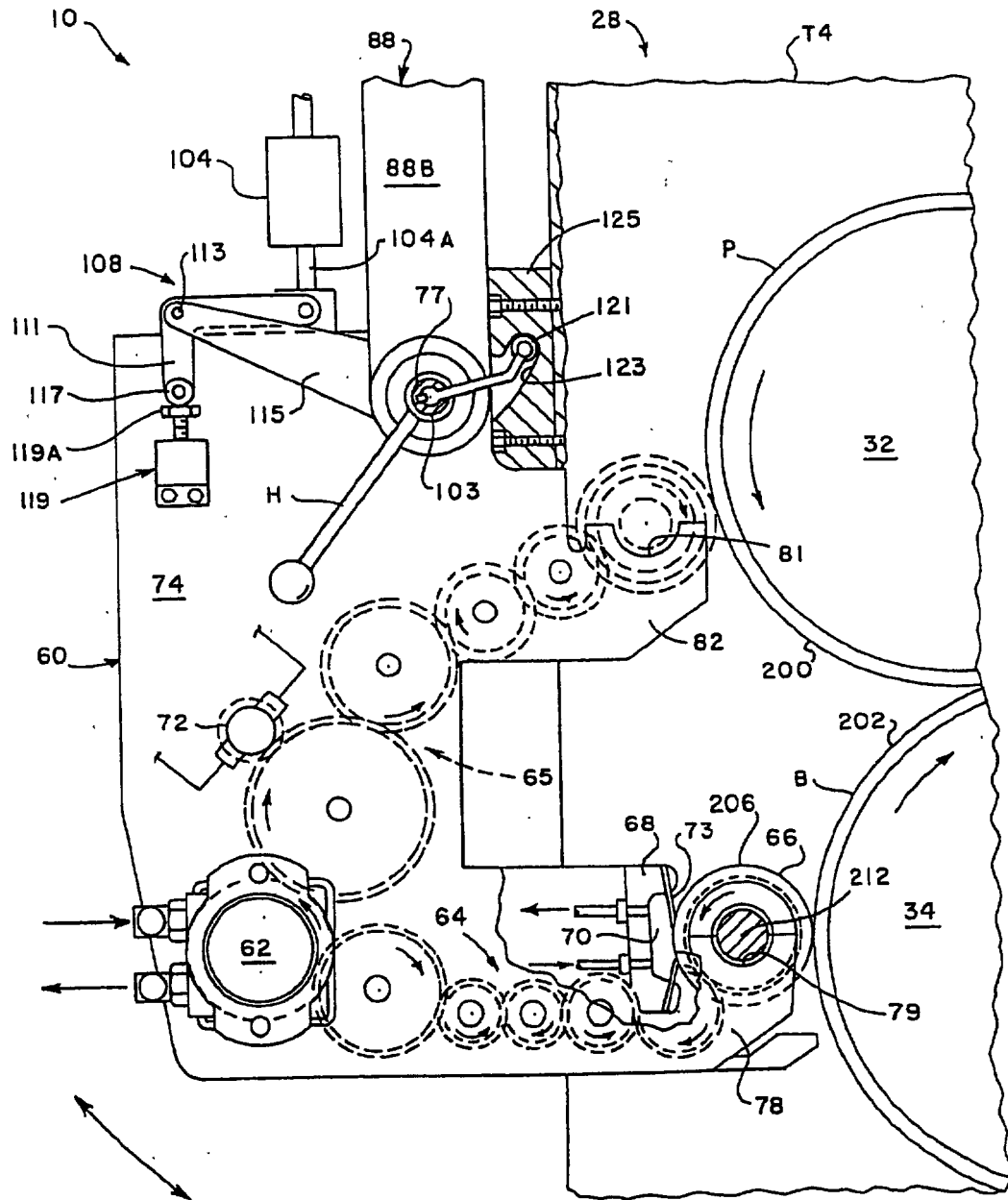


FIG. 6

PRINTING UNIT WITH ANILOX ROLLER BEARER POSITIONING

TECHNICAL FIELD OF THE INVENTION

This invention relates to a printing unit using an anilox roller, and in particular to positioning of the anilox roller within the printing unit.

BACKGROUND OF THE INVENTION

It is common to apply an ink or coating or other liquid material to a cylinder or other surface within a printing unit by contacting the cylinder with an anilox roller. The anilox roller has an outer surface with a series of very precise depressions or dimples which permit a liquid, such as an ink or coating, to be applied to the roller as the surface of the roller passes through a reservoir of the liquid and then transfer a controlled amount of the liquid to another cylinder, such as delivery, printing or blanket cylinder.

It is often an advantage to be able to move the anilox roller into and out of engagement with the cylinder in order to selectively apply a liquid or not, depending on a particular printing job. While adequate devices exist for moving the anilox roller between an on impression and off impression position, it is always difficult and time consuming to insure a proper positioning of the anilox roller relative to the cylinder in the on impression position so as to transfer a uniform coating of a liquid from the anilox roller to the cylinder. An ongoing need exists for a technique and mechanism to make this necessary alignment easier and more rapid in operation. As a result, production speeds would increase and less skilled personnel are needed to operate the printing unit.

SUMMARY OF THE INVENTION

In accordance with one aspect of the present invention, a printing unit is provided. The printing unit includes a cylinder having a bearer surface at each end thereof and an anilox roller having at least one bearer surface formed thereon. A mounting structure is providing for moving the anilox roller between a retracted position and a transfer position, the bearer surface on the anilox roller engaging one of the bearer surfaces on the cylinder in the transfer position to orient the anilox roller relative the cylinder.

BRIEF DESCRIPTION OF THE DRAWINGS

Exemplary embodiments of the present invention are illustrated in the drawing figures wherein:

FIG. 1 is a schematic side elevational view of a sheet-fed, rotary offset printing press having inking/coating apparatus embodying the present invention;

FIG. 2 is a perspective view of the printing press of FIG. 1 in which a dual head inking/coating apparatus is in the operative coating position and a single head coater is in a retracted, overhead position;

FIG. 3 is an enlarged simplified perspective view showing one side of the single head inking/coating apparatus of FIG. 1 in the operative position;

FIG. 4 is a simplified side elevational view showing the dual head inking/coating apparatus in the operative coating position for spot or overall coating from the blanket position;

FIG. 5, is a simplified side elevational view showing the single head inking/coating apparatus in the operative coating position for spot or overall coating from the plate position; and,

FIG. 6 is a simplified side elevational view of the dual head inking/coating apparatus of FIG. 4, partially broken away, which illustrates the hydraulic drive assembly and doctor blade assembly.

DETAILED DESCRIPTION OF THE INVENTION

As used herein, the term "processed" refers to various printing methods which may be applied to either side of a substrate, including the application of UV-curable and aqueous inks and/or coatings. The term "substrate" refers to sheet or web material. Also, as used herein, the term "waterless printing plate" refers to a printing plate having non-image surface areas which are hydrophobic and also having image surface areas which are hydrophilic, wherein the non-image surface areas are characterized by a surface tension value which is less than the surface tension of aqueous ink, and the image surface areas are characterized by a surface tension value which is greater than the surface tension of aqueous ink. "Flexographic" refers to flexible printing plates having a relief surface which is wettable by aqueous ink or aqueous coating material.

As shown in the exemplary drawings, the present invention is embodied in a new and improved in-line inking/coating apparatus 10, for applying inks or protective and/or decorative coatings to sheets or webs printed in a sheet-fed or web-fed, rotary offset or flexographic printing press, herein generally designated 12. In this instance, as shown in FIG. 1, the inking/coating apparatus 10 is installed in a four color printing press 12, such as that manufactured by Heidelberg Druckmaschinen AG of the Federal Republic of Germany under its designation Heidelberg Speedmaster 102V. The press 12 includes a press frame 14 coupled at one end, herein the right end, to a sheet feeder 16 from which sheets, herein designated S, are individually and serially fed into the press, and at the opposite end, with a sheet delivery stacker 20 in which the freshly printed sheets are collected and stacked. Interposed between the sheet feeder 16 and the sheet delivery stacker 20 are four substantially identical rotary offset printing units 22, 24, 26 and 28 which can print different color inks onto the sheets as they are transferred through the press 12. The printing units are housed within printing towers T1, T2, T3 and T4 formed by side frame members 14, 15.

As illustrated, the printing units 22, 24, 26 and 28 are substantially identical and of conventional design. The first printing unit 22 includes an in-feed transfer cylinder 30, a plate cylinder 32, a blanket cylinder 34 and an impression cylinder 36, all supported for rotation in parallel alignment between the press side frames 14, 15. Each of the first three printing units 22, 24 and 26 have an interunit transfer cylinder 38 disposed to transfer the freshly printed sheets from the adjacent impression cylinder to the next printing unit via an interstation transfer cylinder 40. The last printing unit 28 is shown equipped with a delivery cylinder 42 which guides each freshly printed sheet 18 as it is transferred from the last impression cylinder 36 to a delivery conveyor system, generally designated 44, to the sheet delivery stacker 20.

As best seen in FIGS. 4-6, each of the plate cylinders 32, blanket cylinders 34 and impression cylinders 36 have precision machined annular bearers at each end which contacts a similar bearer on the adjacent cylinder. For example, the plate cylinders 32 have annular bearer surfaces 200 at the ends thereof while blanket cylinders 34 have bearer surfaces 202 at the ends thereof. The bearer surfaces

200 of the plate cylinder 32 bear directly on the bearer surfaces 202 of the blanket cylinder 34 to provide a constant and repeatable separation between the rotatable axes of the cylinders 32 and 34. Similarly, the impression cylinder 36 has bearer surfaces 204 at the ends thereof which engage the bearer surfaces 202 on the blanket cylinder 34 to establish a constant and repeatable separation between the rotatable axes of these cylinders. With a predetermined separation between the axes of the cylinders, shim plates can be inserted or removed from underneath the printing plate and the blanket to precisely establish the desired relationship between the cylinders to transfer ink to the material being printed. The cylinders are capable of movement apart from each other for cleaning, maintenance and the like. The use of the bearers permits the cylinders to be reengaged with consistency and uniformity.

The delivery conveyor system 44 as shown in FIG. 2 is of conventional design and includes a pair of continuous delivery gripper chains 46, only one of which is shown carrying at regular spaced locations along the chains, laterally disposed gripper bars having gripper fingers for gripping the leading edge of a freshly printed sheet 18 after it leaves the nip between the delivery cylinder 42 and impression cylinder 36 of the last printing unit 28. As the leading edge is gripped by the grippers, the delivery chains 46 pull the freshly printed sheet away from the impression cylinder 36 and deliver the freshly printed sheet to the sheet delivery stacker 20.

Prior to reaching the delivery sheet stacker, the freshly printed and/or coated sheets S pass under a delivery dryer 48 which includes a combination of infra-red thermal radiation, high velocity hot air flow and heat and moisture extraction for drying the ink and/or the protective/decorative coating on the freshly printed sheets.

In the exemplary embodiment shown in FIG. 1, the first printing unit 22 is equipped with a flexographic printing plate, and does not require an inking roller train or a dampening system. If an ink roller train is mounted on the first printing unit, the form rollers are retracted and locked off when the printing unit goes on impression. Flexographic aqueous ink is supplied by the inking/coating unit 110. The remaining printing units 24, 26 and 28 are equipped for lithographic printing and include an inking apparatus 50 having an inking roller train 52 arranged to transfer ink from an ink fountain 54 to the plate cylinder 32. This is accomplished with the aid of a fountain roller 56 and a ductor roller. The fountain roller 56 projects into the ink fountain 54, whereupon its surface is wetted with printing ink Q. The printing ink Q is transferred intermittently to the inking roller train 52 by the ductor roller. The inking roller train 52 supplies printing ink Q to the image areas of a printing plate P mounted on the plate cylinder 32.

The printing ink Q is transferred from the printing plate P to an ink receptive blanket B which is mounted on the blanket cylinder 34. The inked image carried on the blanket B is transferred to a sheet S as the sheet is transferred through the nip between the impression cylinder 36 and the blanket B.

The inking roller arrangement 52 illustrated in FIG. 1 is exemplary for use in combination with lithographic ink printing plates. It will be understood that dampening rollers (not illustrated) will be in direct engagement with the lithographic plate P, but are not used in combination with the flexographic plate of printing unit 22.

Referring now to FIG. 4, FIG. 5 and FIG. 6, the in-line inking/coating apparatus 10 includes a carriage assembly 58

which supports an applicator head 60. The applicator head 60 includes a hydraulic motor 62, a lower gear train 64, an upper gear train 65, an anilox applicator roller 66 and a doctor blade assembly 68. The external peripheral surface of the applicator roller 66 is inserted into wetting contact with liquid coating material or ink contained in a reservoir 70. The reservoir 70 is continuously supplied with ink or coating which is circulated through the reservoir 70 from an off-pressure source by a pump (not illustrated). The hydraulic motor 62 drives the applicator roller 66 synchronously with the plate cylinder 32 and the blanket cylinder 34 in response to an RPM control signal from the press drive (not illustrated) and a feedback signal developed by a tachometer 72. While a hydraulic drive motor is preferred, an electric drive motor can be used.

The applicator roller 66 is preferably a fluid metering anilox roller which transfers measured amounts of printing ink or coating material onto the printing plate or blanket. The surface 220 of an anilox roller is engraved with an array of closely spaced, shallow depressions referred to as "cells". Ink or coating material from the reservoir 70 flows into the cells as the anilox roller turns through the reservoir. The transfer surface of the anilox roller is scraped with a doctor blade 73 to remove excess ink or coating. The ink or coating remaining on the anilox roller is the measured amounts contained within the cells.

The applicator roller 66 is cylindrical and may be constructed in various diameters and lengths, containing cells of various sizes and shapes. The volumetric capacity of an anilox roller is established during manufacturing and is dependent upon the selection of cell size, shape and number of cells per unit area. Depending upon the intended application, the cell pattern may be fine (many small cells per unit area) or coarse (fewer larger cells per unit area).

A significant advantage of the applicator roller 66 is the use of bearer surfaces 206 at the ends 208 and 210 thereof which are positioned a distance apart along the axis of rotation 212 of the applicator roller 66 equal to the distance between the bearer surfaces 200 and 202 on the plate cylinder 32 and blanket cylinder 34, respectively. The applicator roller 66 is positioned within the inking/coating apparatus 10 so that the bearer surfaces 206 are aligned with the bearer surfaces 200 and 202. As will be described in greater detail hereinafter, as the applicator roller 66 is moved into engagement with either the plate cylinder 32 or the blanket cylinder 34, the bearer surfaces 206 move into direct contact with either the bearer surfaces 200 or 202 to precisely position the applicator roller 66 relative to the plate cylinder 32 or blanket cylinder 34.

Often cylinders, such as plate cylinder 32, blanket cylinder 34 and impression cylinder 36, have a gap 222 (FIG. 4) in their surface, perhaps amounting to one-eighth to one-quarter of the total circumference of the cylinder, which is used, for example, to attach the printing plate or blanket to the particular cylinder. In the past, when an applicator roller 66 has been applied against the surface of a plate cylinder or blanket cylinder by a constant force, such as an air cylinder or the like, the applicator roller would have a tendency to drop slightly into the gap and then bounce away from the cylinder as the roller comes to the end of the gap. This has caused a lack of coating on the first portion of the substrate or sheet being coated. By using an applicator roller 66 having bearers mated with the bearers on the cylinders, this bounce is eliminated as the bearer surfaces are in constant contact.

While typical bearers on plate cylinders, blanket cylinders and impression cylinders are formed of hardened steel, the

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bearer surfaces 206 on the applicator roller 66 can be made out of metal, hard plastic, such as Delrin, or other suitable material that adequately positions the applicator roller 66 consistently relative to the cylinders 32 or 34.

By applying the ink or coating material through the inking/coating applicator head 60, more ink or coating material can be delivered to the sheet S as compared with the inking roller train of a lithographic printing unit. Moreover, color intensity is stronger and more brilliant because the flexographic ink is applied at a much larger film thickness than can be applied by the lithographic process and is not diluted by dampening solution.

The inking/coating applicator head 60 includes side frame members 74, 76 that support the applicator roller 66, gear train 64, gear train 65, doctor blade assembly 68 and the drive motor 62. The applicator roller 66 is supported at opposite ends on a lower cradle formed by a pair of end plates 78, 80 which hold the applicator roller 66 in parallel alignment with the blanket cylinder 34 (FIG. 5). The side frames 74, 76 are also provided with an upper cradle formed by a pair of side plates 82, 84 which are vertically spaced with respect to the lower side plates 78, 80. Each cradle has a pair of sockets 79, 81 and 83, 85, respectively, for holding the applicator roller 66 for spot coating or inking engagement against the plate P of the plate cylinder 32 (FIG. 4) or the blanket B of the blanket cylinder 34.

Preferably, the applicator roller 66 for the upper cradle (plate) position is an anilox roller having a resilient transfer surface. In the dual cradle arrangement, the press operator can quickly change over from blanket inking/coating and plate inking/coating with minimum press down time, since it is only necessary to remove and reposition or replace the applicator roller 66, and wash-up the doctor blade assembly if changing from ink to coating or vice versa. The capability to selectively operate in either the flexographic mode or the lithographic mode and to print or coat from either the plate or blanket position is referred to herein as the "LITHOFLEX" process.

Referring again to FIG. 2 and FIG. 3, the applicator head 60 is supported by the carriage assembly 58 in a cantilevered, pivotal arrangement which allows the dual cradle inking/coating apparatus 10 and a single cradle inking/coating apparatus 110 to be used between any two adjacent printing units, as well as used on the first and last printing units of the press. This is made possible by a pair of cantilevered support arms 88, 90 that are pivotally coupled to the side plates 74, 76, respectively, on a pivot shaft 77. Each support arm has a hub portion 88A, 90A, respectively, and an elongated shank portion 88B, 90B, respectively.

The cantilevered support arms are pivotally mounted on the printing tower by pivot blocks 92, 94, respectively. The hub portions 88A, 90A are journaled for rotation on pivot shafts 96, 98, respectively. The pivot blocks 92, 94 are securely fastened to the tower 14D, so that the carriage assembly 86 is pivotally suspended from the pivot shafts 96, 98 in a cantilevered Ferris support arrangement. The shank portions 88B, 90B are pivotally coupled to the pivot shaft 77, so that the carriage assembly 58 and the applicator head 60 are capable of independent rotation with respect to each other and with respect to the pivot shaft 77. By this arrangement, the applicator head 60 is pivotally suspended from the pivot shaft 77, and remains in an upright orientation as the support arms rotate from the operative position to the fully retracted position, and vice versa.

Thus, the cradles 78, 80 and 82, 84 position the applicator roller 66 in vertical and horizontal alignment with the plate

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cylinder or blanket cylinder when the applicator head is extended to the operative position, for example as shown in FIG. 4 and FIG. 5. Moreover, because of the transverse relationship between the hub portion and shank portion of the support arms, the applicator head 60 and carriage assembly 58 are capable of rotating through a Ferris arc without touching the adjacent printing tower. This makes it possible to install the inking/coating apparatus 10 on any intermediate printing unit tower (T2, T3), and as well as on the first printing unit tower T1 and the last printing unit tower T4. Additionally, when the inking/coating unit 10 is in the operative position, the lateral projection of the applicator head 60 into the interstation space between printing units is minimized. This assures virtually unrestricted operator access to the interstation space between adjacent printing units when the applicator head is engaged in the operative position, and completely unrestricted access when the carriage assembly 58 is retracted.

Rotation of the carriage assembly 58 is counterclockwise from the retracted, idle position (shown in phantom in FIG. 1) to the operative position (FIG. 4 and FIG. 5). The carriage assembly 58 can be adapted for clockwise rotation from the retracted position to the operative position for engagement of the applicator roller to either the plate or the blanket on the dampener side of the tower, assuming that access to the plate and blanket is not restricted by dampener rollers or the like.

Rotational movement of the support arms 88, 90 is assisted by counterweights 100, 102 which are secured to the support arms, respectively, for concurrent rotation with respect to the pivot blocks 92, 94. With the passive assistance of the counterweights, the press operator can easily move the inking/coating assembly 10 from the engaged operative position as shown in FIG. 4 to the fully retracted, idle position as shown in phantom in FIG. 1. Preferably, rotation of the carriage assembly 58 is assisted by a torsion spring, electric motor or hydraulic motor.

The inking/coating apparatus 10 is releasably locked into the operative position as shown in FIG. 4 by releasable latch couplings 103, 105 that secure the support arms 88, 90 to the press side frames 14, 15, respectively, of the printing unit tower T4 in the operative position. Coating engagement of the bearer surfaces 206 of applicator roller 66 against the bearer surfaces 202 of blanket cylinder 34 is produced by power actuators, preferably pneumatic cylinders 104, 106 which have extendable/retractable power transfer arms 104A, 106A, respectively. The pneumatic cylinder 104 is pivotally coupled to the support arm 88 by a pivot linkage 108, and the second pneumatic cylinder 106 is pivotally coupled to the support arm 90 by a pivot linkage 109. In response to actuation of the pneumatic cylinders 104, 106, the power transfer arms are retracted. As the transfer arms retract, the inking/coating head 60 is rotated counterclockwise on the pivot shaft 77, thus moving the applicator roller 66 into coating engagement with the blanket cylinder 34 by forcing the bearer surfaces 206 against bearer surfaces 202.

The pivot linkage 108 includes a bell crank 111 which is mounted for pivotal movement on a pin 113. The pin 113 is supported by a clevis plate 115 which is attached to the support arm 88. One end of the bell crank is pivotally coupled to the actuator arm 104A, and a cam roller 117 is mounted for rotation on its opposite end.

The cam roller 117 is engageable against an adjustable stop 119 which is rigidly secured to the side plate 74. Counterclockwise shifting of the handle H moves a cam follower 121 into a latch pocket 123 of a receiver block 125 as the

cam roller 117 is moved into engagement with the adjustable stop 119 in the interlocked, operative position. Referring to FIG. 4, FIG. 5 and FIG. 6, the receiver block 125 is secured to the delivery side of the printing unit tower by machine screws.

When the plate P goes on impression, power is applied to the pneumatic actuator 104 and the power transfer arm 104A retracts, thus causing the bell crank 111 to rotate counterclockwise about the pin 113. The torque applied by the pneumatic actuator 104 is transmitted to the applicator head 60 through the cam roller 117 and the adjustable stop 119. Counterclockwise movement of the applicator head 60 relative to the support shaft 77 carries the applicator roller 66 into engagement with the plate P.

The adjustable stop 119 has a threaded bolt 119A which is engagable with the cam roller 117. The striking point of engagement is preset so that the bearer surface 206 of the applicator roller 66 is properly positioned to engage the bearer surfaces 202 or 204 of the plate P or blanket B in the operative position to precisely position the applicator roller 66 relative to the cylinder when the applicator head 60 is interlocked with the press frame 14 and the printing unit goes on impression.

If desired, the structure, such as stop 119, bolt 119A and the like, can be eliminated and the position of the applicator roller 66 be set by simply activating cylinders 104 until bearer surfaces 206 engage either bearer surfaces 202 or bearer surfaces 204 and then maintaining sufficient force in cylinders 104 to maintain the bearer surfaces in continuous contact.

Referring to FIG. 5, an inking/coating apparatus 110 having a single head is illustrated. The construction of this alternative embodiment is identical in all respects with the dual head arrangement, with the exception that only a single gear train and a single cradle for holding the applicator roller is provided. In both embodiments, the inking/coating head 60 remains upright as it swings through an arc, comparable to the movement of a Ferris wheel. Because of the upright orientation of the inking/coating head 60 as it moves between the extended and retracted positions, the usual platform spacing between printing unit towers provides adequate clearance to permit extension and retraction of the carriage assembly 58 without interference with operator access to the printing units. This is a significant advantage in that it permits the in-line inking/coating apparatus 10 to operate effectively in the interstation space between any adjacent printing units, and without blocking or obstructing access to the cylinders of the printing units when the inking/coating apparatus is in the retracted position (as indicated in phantom in FIG. 1).

Moreover, when the in-line inking/coating apparatus is in the fully retracted position, the applicator roller 66 is conveniently positioned on the dampener side of the printing unit for inspection, clean-up or replacement. Additionally, the doctor blade assembly is also conveniently positioned for inspection, removal, adjustment or clean-up. Also, the doctor blade reservoir and coating circulation lines can be cleaned while the press is running as well as when the press has been stopped for change-over from one type of ink or coating material to another.

When the inking/coating apparatus is used for applying an aqueous ink or an aqueous coating material, the water component on the freshly printed sheet S is evaporated by a high velocity, hot air interstation dryer and high volume heat and moisture extractor units 112 and 114, as shown in FIG. 1, FIG. 4 and FIG. 5. The dryer/extractor units 112 and 114

are oriented to direct high velocity heated air onto the freshly printed/coated sheets as they are transferred by the interunit and the intermediate transfer cylinders 36, 40. By this arrangement, the freshly printed aqueous ink or coating material is completely dry before the sheet is overprinted in the next printing unit.

The high velocity, hot air dryer and high performance heat and moisture extractor units 112, 114 utilize high velocity air jets which scrub and break-up the moist air level which clings to the surface of each freshly printed sheet. Within each dryer, high velocity air is heated to a high temperature as it flows across a resistance heating element within an air delivery baffle tube. High velocity jets of hot air are discharged through multiple airflow apertures through an exposure zone Z (FIG. 4 and FIG. 5) onto the freshly printed/coated sheet S as it is transferred by the transfer cylinder 36 and intermediate transfer cylinder 40, respectively. Each dryer assembly includes a pair of air delivery dryer heads which are arranged in spaced, side-by-side relation as shown in FIG. 4 and FIG. 5.

The high velocity, hot moisture-laden air displaced from each freshly printed sheet is extracted from the dryer exposure zone Z and completely exhausted from the printing unit by the high volume extractors. Each extractor head includes a manifold coupled to the dryer heads and draws the moisture, volatiles and high velocity hot air through a longitudinal gap between the dryer heads. According to this arrangement, each printed sheet is dried before it is run through the next printing unit.

The water-based inks used in flexographic printing dry at a relatively moderate drying temperature provided by the interstation high velocity hot air dryers/extractors 112, 114. Consequently, print quality is substantially improved since the aqueous ink is dried at each printing unit before it enters the next printing unit. Moreover, back-trapping on the blanket of the next printing unit is completely eliminated. This interstation drying arrangement makes it possible to print aqueous inks such as metallic ink and opaque white ink at one printing unit, and then overprint at the next printing unit.

This arrangement also permits the first printing unit to be used as a coater in which an aqueous coating is applied to low grade paper, for example recycled paper, to trap and seal in lint, dust, spray powder and other debris and provide a smoother, durable surface that can be overprinted in the next printing unit. The first down coating seals the surface of the low grade, rough substrate and improves overprinted dot definition while preventing strike-through and show-through. A UV-curable protective and/or decorative coating can be applied over the first down overprinted (aqueous) coating in the last printing unit. EPDM is known to be completely acceptable for use with UV-curable inks and coating applications.

A demonstration resilient anilox roller was made by covering a steel core with about 1/4 inch of rubber to a diameter of about four inches. The rubber had a hardness of about 80 on the Shore "A" scale. The surface was laser engraved by Consolidated Engravers, 2255 West Longhorn Dr., Lancaster, Tex. 76134 with four different patterns in approximately 10 inch wide bands across the face comprising about 125, 150, 175 and 200 lines/inch with what was a "hexagonal" cell pattern. Satisfactory coatings were applied via the plate cylinder to a substrate with all four patterns. A second resilient anilox roll was obtained which had only one 150 lines/inch overall pattern with a cell volume of about 9 cubic billion microns (CBM). Satisfactory coating was

applied from this roll against a plate. Coating was applied to the roll by a sealed doctor blade assembly like assembly 68 in FIG. 6. The roller produced useful film weight. Water based inks were applied satisfactorily in various colors. The surface speed of the plate and resilient anilox rollers were kept about the same. No reason is seen why a roller train similar to fountain assembly 69 in FIG. 8 could not be used to supply coating to a resilient anilox roller 66. The resilient anilox roller will accommodate slight variations in elevation for a printing plate or blanket much better than a ceramic or hard surface anilox roller.

Preferably, the applicator roller 66 is constructed of metal or ceramic when it is used for applying a coating material to the blanket B on the cylinder 34. When the applicator roller 66 is applied to the plate, it is preferably constructed as an anilox roller having a resilient transfer surface for engaging a flexographic printing plate with the bearer surfaces 206 made of a harder material such as a plastic, for example, Delrin, or a metal. Suitable resilient roller surface materials include Buna N synthetic rubber and EPDM (terpolymer elastomer).

It will be appreciated that the inking/coating apparatus 10 is capable of applying a wide range of ink types, including fluorescent (Day Glo), pearlescent, metallics (gold, silver and other metallics), glitter, scratch and sniff (micro-encapsulated fragrance), scratch and reveal, luminous, pressure-sensitive adhesives and the like.

The press operator can eliminate the dampener roller assembly altogether, and the inking/coating apparatus 10 can selectively apply aqueous inks and coatings to a flexographic or waterless printing plate and the blanket. Moreover, overprinting of the aqueous inks and coatings can be carried out in the next printing unit since the aqueous inks and coatings are completely dried by the high velocity, hot air interstation dryer and high volume heat and moisture extractor assembly.

The aqueous inks and coatings as used in the present invention contain colored pigments and/or soluble dyes, binders that fix the pigments onto the surface of the printed sheet, and waxes, defoamers and thickeners. Aqueous printing inks predominantly contain water as a solvent, diluent and/or vehicle. The thickeners which are preferred include algonates, starch, cellulose and its derivatives, for example cellulose esters or cellulose ethers and the like. Coloring agents including organic as well as inorganic pigments may be derived from dyes which are insoluble in water. Also, the printing ink may contain water and can be predominantly glycol or the like, with the pigment being bound by an appropriate resin. When metallic inks are printed, the cells of the anilox roller must be appropriately sized to prevent the metal particles from getting stuck within the cells. The cell size is critical, and for metallic gold ink, the anilox roller should have a screen line count in the range of 175-300 lines per inch (69-188 lines per cm).

The inking/coating apparatus 10 can also apply UV-curable inks and coatings. If UV-curable inks and coatings are utilized, ultra-violet dryers/extractors are installed adjacent the high velocity hot air dryer/extractor units 112, 114, respectively.

It will be appreciated that the inking/coating apparatus 10 described herein makes it possible to selectively operate a printing unit in either the flexographic printing mode or the lithographic printing mode, while also providing the capability to print or coat from either the plate or blanket position. The dual cradle support arrangement of the present invention makes it possible to quickly change over from

inking/coating at the blanket cylinder position to inking/coating at the plate cylinder position with minimum press down-time, since it is only necessary to remove and reposition or replace the applicator roller 66 while the printing/inking apparatus is in the retracted position.

Moreover, the press operator may elect to spot or overall coat with aqueous ink/coating from the plate during one job, and then spot and/or overall coat from the blanket during the next job. Since the doctor blade assembly can be flushed and washed-up quickly and the applicator roller can be replaced quickly, it is possible to spot coat or overall coat from the plate position or the blanket position with aqueous inks or coatings during the first press run and then spot coat or overall coat with UV-curable inks or coatings from the plate position or from the blanket position during the next press run. The inking/coating apparatus 10 is completely out of the way in the retracted position; consequently, the doctor blade reservoir and supply lines can be flushed and washed-up by automatic wash-up equipment while the printing unit is printing another job.

The positioning of the applicator head and roller assembly relative to the plate and blanket is repeatable to a predetermined, preset impression position due to the positive contact between bearer surfaces 206 on applicator roller 66 and the bearer surfaces 202 on plate cylinder 32 or bearer surfaces 204 on blanket cylinder 34. Consequently, no printing unit adjustment or alteration is required, except for flushing the doctor blade assembly and cleaning or replacing the applicator roller to accommodate a different kind of ink or coating material. Although manual extension and retraction have been described in connection with the exemplary embodiment, extension to the operative position and retraction to a non-operative idle position can be carried out automatically by hydraulic or electric motor servomechanisms.

The Ferris wheel support arrangement allows the inking/coating apparatus to operate effectively in the interstation space between any adjacent printing units, as well as on the first or last printing units of the press, without blocking or obstructing the interstation space or restricting operator access to the cylinders of any of the printing units.

Finally, because the inking/coating apparatus of the present invention is mounted on a printing unit tower and is extendable to the operative position without requiring adjustment or alteration of the printing unit cylinders, it can be used for applying printing ink or coating material to the blanket cylinder of a rotary offset web press, or to the blanket of a dedicated coating unit.

I claim:

1. A printing unit of the type having at least one offset lithographic printing station, comprising:

an offset plate cylinder mounted for rotation about a first axis of rotation, the plate cylinder have a plate supporting surface and a bearer on each side of the plate supporting surface, said bearers being located at a radial distance with respect to the first axis of rotation and having a continuous bearer surface; which rotates with the offset plate cylinder

an anilox roller for applying ink or coating to a plate on the plate cylinder, the anilox roller having a central surface portion adapted for applying ink or coating to a plate, the anilox roller having laterally spaced end portions outside the central portion with concentrically located bearers on each end portion, the bearers having a continuous bearer surface adapted to engage one of the bearers on the plate cylinder; and

- an anilox mounting structure mounting the anilox roller for rotation about a second axis, and for movement of the anilox roller relative to the plate cylinder between a retracted position and an engaged position, wherein the bearer surfaces of the anilox roller are brought into contact with the bearer surfaces of the plate cylinder to repeatedly set the anilox roller at a desired position relative to the plate cylinder, to prevent the anilox roller from bouncing and thereby creating printing defects when it reaches a gap area in the printing cylinder.
2. The printing unit of claim 1 wherein the anilox roller has a resilient surface for applying the ink or coating.
3. A printing unit of the type having at least one offset lithographic printing station, comprising:
- an offset blanket cylinder mounted for rotation about a first axis of rotation, the blanket cylinder have a blanket supporting surface and a bearer on each side of the blanket supporting surface, said bearers being located at a radial distance with respect to the first axis of rotation and having a continuous bearer surface; which rotates with offset blanket cylinder
 - an anilox roller for applying ink or coating to a blanket on the blanket cylinder, the anilox roller having a central surface portion adapted for applying ink or coating to a blanket, the anilox roller having laterally spaced end portions outside the central portion with concentrically located bearers on each end portion, the bearers having a continuous bearer surface adapted to engage one of the bearers on the plate cylinder; and
 - an anilox mounting structure mounting the anilox roller for rotation about a second axis, for movement of the anilox roller relative to the blanket cylinder between a retracted position and an engaged position, wherein the bearer surfaces of the anilox roller are brought into contact with the bearer surfaces of the blanket cylinder to repeatedly set the anilox roller at a desired position relative to the blanket cylinder, to prevent the anilox roller from bouncing and thereby creating printing defects when it reaches a gap area in the blanket cylinder.
4. The printing unit of claim 3 wherein the anilox roller has a resilient surface for applying the ink or coating.
5. A method of applying a liquid to a printing plate on an offset plate cylinder being rotated on an axis of rotation in a printing press, comprising:
- providing an offset plate cylinder mounted for rotation on a first axis, the plate cylinder having opposite end portions wherein the end portions have concentric bearers having a continuous bearer surface;
 - providing an anilox roller mounting structure for mounting an anilox roller for rotation about a second axis and for movement of the anilox roller relative to the plate cylinder between a retracted position and an engaged position with a plate;

- providing an anilox roller with a central portion for applying liquid to a plate on the plate cylinder, wherein the anilox roller has end portions outside the central portion with a concentrically located bearer on each end portion, having a continuous bearer surface adapted to engage a corresponding bearer surface on the plate cylinder;
 - rotating the anilox roller in contact with a liquid to be applied to a plate on the plate cylinder;
 - moving the mounting structure to bring the bearers on the anilox roller into engagement with the bearers on the plate cylinder; and
 - rotating the anilox roll and plate cylinder while maintaining the bearers in a rolling engagement to prevent printing defects created when the anilox roller traverses a gap in the plate cylinder.
6. The method of claim 5 wherein the step of providing an anilox roller comprises the step of providing an anilox roller with a resilient surface.
7. A method of applying a liquid to a printing blanket on an offset blanket cylinder being rotated on an axis of rotation in a printing press, comprising:
- providing an offset blanket cylinder mounted for rotation on a first axis, the blanket cylinder having opposite end portions wherein the end portions have concentric bearers having a continuous bearer surface;
 - providing an anilox roller mounting structure for mounting an anilox roller for rotation about a second axis and for movement of the anilox roller relative to the blanket cylinder between a retracted position and an engaged position with a blanket;
 - providing an anilox roller with a central portion for applying liquid to a blanket on the blanket cylinder, wherein the anilox roller has end portions outside the central portion with a concentrically located bearer on each end portion, having a continuous bearer surface adapted to engage a corresponding bearer surface on the blanket cylinder;
 - rotating the anilox roller in contact with a liquid to be applied to a blanket on the blanket cylinder;
 - moving the mounting structure to bring the bearers on the anilox roller into engagement with the bearers on the blanket cylinder; and
 - rotating the anilox roll and blanket cylinder while maintaining the bearers in a rolling engagement to prevent printing defects created when the anilox roller traverses a gap in the blanket cylinder.
8. The method of claim 7 wherein the step of providing an anilox roller comprises the step of providing an anilox roller with a resilient surface.

* * * * *

2019年12月31日

08 435798

PATENT

Attorney Docket
No. B6012



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

RONALD M. RENDLEMAN, ET AL

Serial No.:

Filed: (Herewith)

For: RETRACTABLE INKING/COATING
APPARATUS HAVING FERRIS
MOVEMENT BETWEEN PRINTING
UNITS

Group Art Unit _____

Examiner:

Box PATENT APPLICATION
Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

CERTIFICATE OF MAIL BY "EXPRESS MAIL"

$\Delta \pi$ EXHIBIT <u>9</u>	
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Date of Deposit: Thursday, May 4, 1995

I hereby certify that the attached patent application papers and documents referred to as enclosed therewith are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. §1.10 in an envelope addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231 on the date of deposit indicated above.

Kathy Longenecker
(Typed Name of Person Depositing
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Kathy Longenecker
Signature

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W001354



PATENT

Attorney Docket
No. B6012

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

RONALD M. RENDLEMAN, ET AL

Serial No.:

Filed: (Herewith)

For: RETRACTABLE INKING/COATING
APPARATUS HAVING FERRIS
MOVEMENT BETWEEN PRINTING
UNITS

Group Art Unit _____

Examiner:

Box PATENT APPLICATION
Commissioner of Patents
and Trademarks
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Sir:

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PATENT

Attorney Docket
No. B6012



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

RONALD M. RENDLEMAN, ET AL

Serial No.:

Filed: (Herewith)

For: RETRACTABLE INKING/COATING
APPARATUS HAVING FERRIS
MOVEMENT BETWEEN PRINTING
UNITS

Group Art Unit _____

Examiner:

Box PATENT APPLICATION
Commissioner of Patents
& Trademarks
Washington, D.C. 20231

Sir:

INSTRUCTIONS AS TO
UNDERPAYMENT/OVERPAYMENT OF FEES

1. UNDERPAYMENT

The Commissioner is hereby authorized to charge any fee deficiency relating to the filing of this patent application to:

Deposit Account No. 01-0657

2. OVERPAYMENT

The Commissioner is hereby authorized to credit any fee overpayment relating to the filing of this patent application to:

Deposit Account No. 01-0657

Respectfully submitted,

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W001356

08 435798

PATENT

Attorney Docket

No. B6012

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box PATENT APPLICATION
 Commissioner of Patents
 and Trademarks
 Washington, D.C. 20231

Sir:

Transmitted herewith for filing is the patent applica-
 tion of:

Inventors: Ronald M. Rendleman, Howard W. DeMoore
 and John W. Bird

For: "Retractable Inking/Coating Apparatus
 Having Ferris Movement Between Printing
 Units"

Enclosed are:

<u>1</u> pages of abstract	<u>X</u> Combined Declaration/ Power of Attorney
<u>22</u> pages of specification	<u>X</u> Statement of Small Entity Status
<u>11</u> pages of claims	<u> </u> Assignment
<u>5</u> pages of drawings	
<u> </u> Other: <u> </u>	<u>X</u> Underpayment/Overpayment Instructions
	<u>X</u> Post Office Express Certificate <u>EF769560825US</u>

The filing fee has been calculated as shown below:

For:	No. Filed	No. Extra	Small Entity Rate	Fee
Basic Fee				\$365.00
Total Claims	34 - 20 =	14	x \$ 11....	154.00
Indep. Claims	6 - 3 =	3	x \$ 38....	114.00
Multiple dependent claims	-NONE-		+ \$120....	-0-
Assignment Recording Fee			\$ 40....	-0-

TOTAL.....\$633.00

W001352

our check in the amount of \$ 633.00 is enclosed.

Respectfully submitted,

Date: May 4, 1995

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TELETYPE UNIT

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No. B6012

SPECIFICATION

accompanying

Application for Grant of U.S. Letters Patent

JOINT
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TITLE: "RETRACTABLE INKING/COATING APPARATUS HAVING FERRIS
MOVEMENT BETWEEN PRINTING UNITS"

Field of the Invention

1 This invention relates to sheet-fed or web-fed, rotary
2 offset or flexographic printing presses, and more particularly, to
3 a new and improved inking/coating apparatus for the in-line
4 application of printing inks or protective or decorative coatings
5 to sheets or web.

6 Background of the Invention

7 Conventional sheet-fed, rotary offset printing presses
8 typically include one or more printing units through which
9 individual sheets are fed and printed with wet ink. After the
10 last printing unit, the sheets are transferred by a delivery
11 conveyor to the delivery end of the press where the freshly
12 printed sheets are collected and stacked. In a typical sheet-fed,
13 rotary offset printing press such as the Heidelberg Speedmaster
14 line of presses, the delivery conveyor includes a pair of endless
15 gripper chains carrying gripper bars and gripper fingers which
16 grip and pull freshly printed sheets from the last impression
17 cylinder and convey the sheets to the sheet delivery stacker.

1 Since the inks used with rotary offset printing presses
2 typically remain wet and tacky for some time after printing,
3 special precautions must be taken to insure that the freshly
4 printed sheets are not marked or smeared as the sheets are
5 transferred from one printing unit to another, and while being
6 conveyed to the sheet delivery stacker. The printed surface of
7 the sheet dries relatively slowly and can be smeared during
8 subsequent transfer between printing units. In order to reduce
9 smearing and offsetting, spray powder is applied on the printed
10 sheet.

11 In some printing applications, offset and smearing are
12 prevented by applying a protective and/or decorative coating over
13 all or a portion of the freshly printed sheets. Some coating
14 solutions include varnish, lacquer, dye, moisturizers and ink.
15 Such coatings are formed of a UV-curable or water-dispersed resin
16 applied as a liquid solution or emulsion over the freshly printed
17 sheets to protect the ink and improve the appearance of the
18 freshly printed sheets. Such coatings are particularly desirable
19 when decorative or protective finishes are required such as in the
20 production of posters, record jackets, brochures, magazines,
21 folding cartons and the like. The coating is permeable to oxygen
22 to permit drying of the ink. In cases where a liquid coating is
23 to be applied, the coating operation is carried out after the last
24 color ink has been printed. In some cases, it is desirable to
25 spot coat from the printing plate. For both operations, the
26 coating is most desirably performed by an in-line coater.

27 In printing presses having flexographic printing plates,
28 an aqueous ink is used, for example metallic (gold) ink and opaque
29 white ink, both of which can be overprinted at the next printing
30 unit. An advantage of flexographic printing is that no dampening
31 unit is required. The flexographic printing plate has a raised
32 image surface (relief). Colors are stronger when flexographic
33 inks are used because they are not diluted by dampening solution.

1 Description of the Prior Art

2 Various arrangements have been made for applying the
3 coating as an in-line printing operation by using the last
4 printing unit of the press as the coating application unit. For
5 example, in U.S. Patents 4,270,483, 4,685,414 and 4,779,557, there
6 are disclosed coating apparatus which can be moved into position
7 to allow the blanket cylinder of the last printing unit of a press
8 to be used to apply a coating material to the sheets. In U.S.
9 Patent 4,796,556 and U.S. Patent 4,841,903 there is disclosed a
10 coating apparatus which can be selectively moved between the
11 blanket cylinder or the plate cylinder of the last printing unit
12 of the press so that the last printing unit can only be used for
13 coating purposes. However, when coating apparatus of these types
14 are used, the last printing unit cannot be used to apply ink to
15 the sheets, but rather can only be used for the coating operation.
16 Thus, while coating with these types of in-line coating apparatus,
17 the press loses the capability of printing its full range of
18 colors since the last printing unit is converted to a coating
19 unit.

20 Proposals for overcoming the problem of the loss of a
21 printing unit when in-line coating is desired have also been made,
22 such as that set forth in U.S. Patent 4,934,305 which discloses a
23 coating apparatus having a separately timed applicator roller
24 positioned to apply the coating material to the freshly printed
25 sheet while the sheet is on the last impression cylinder of the
26 press. This is said to allow the last printing unit to print and
27 coat simultaneously, so that no loss of a printing unit capability
28 results. Another approach to providing a coating unit without
29 losing the printing capabilities of the last printing unit is to
30 provide a totally separate coating unit downstream of the last
31 printing unit so that the coating is applied to the sheets after
32 the last printing unit. Such an arrangement is disclosed in U.S.
33 Patents 4,399,767, 4,706,601 and 5,176,077.

34 In an effort to reduce costs and maintain flexibility in
35 adapting the printing press to different jobs, coating apparatus

1 has been provided that can be selectively engaged with the plate
2 cylinder or blanket cylinder to carry out the coating operation,
3 and disengaged so that the last printing unit can be used for
4 offset printing when coating is not required. Examples of coaters
5 which are selectively engagable with either the plate cylinder or
6 the blanket cylinder are disclosed in U.S. Patent 4,615,293
7 (Jahn), U.S. Patent 5,107,790 (Sliker et al.) and U.S. Patent
8 4,841,903 (Bird).

9 The coater of U.S. Patent 4,615,293 includes two
10 applicator rollers, both disposed on the dampening side of the
11 plate cylinder and blanket cylinder for carrying out spot and
12 blanket coating operations as desired. The coater of U.S. Patent
13 5,107,790 is retractable along an inclined rail for extending and
14 retracting a coater head into engagement with either the plate
15 cylinder or the blanket cylinder. Because of its size, the
16 rail-retractable coater can only be installed between the last
17 printing unit of the press and the delivery stacker, and cannot be
18 used at interstation positions. The coaters of Patent 4,615,293
19 are located on the dampener side of the plate and blanket cylin-
20 ders, thus requiring removal of the dampening unit to make room
21 for the doctor blade head and applicator rollers. Consequently,
22 the last printing unit of the press is converted into a coating
23 unit, resulting in the loss of the printing capability of that
24 printing unit.

25 It will be appreciated that the time required to
26 reconfigure a press for coating or non-coating is non-productive
27 and costly. Accordingly, there is a need for a coating apparatus
28 which minimizes the time to clean-up from one printing run and set
29 up and run the next job. Where consecutive jobs require the same
30 type of coating, particularly blanket coating, it may not be
31 necessary to clean-up the coater between jobs. However, the
32 coating cannot be allowed to dry on the rollers. Therefore,
33 especially when switching from blanket to spot coating or vice
34 versa, or if there is a delay between jobs, it is necessary to
35 wash-up the coater after each job is completed.

1 In addition, wash-up is necessary when switching between
2 different coating compositions, such as aqueous and ultra violet
3 (UV) curable coatings. Such coatings are not interchangeable, and
4 the coaters must be washed between applications of the different
5 coating media. It is difficult to wash-up some coaters while the
6 press is running. Moreover, the retractable coaters mentioned
7 above occupy a large amount of press space and diminishes
8 accessibility to the press. Elaborate equipment is needed for
9 retracting the coater from the operative coating position to an
10 out-of-the-way, inoperative position which reduces access to the
11 printing unit.

12 A limitation on the use of flexographic printing plates
13 and aqueous printing inks is that the freshly printed or coated
14 sheets require hot air for drying. When applying an aqueous ink
15 such as opaque white or metallic gold, it is necessary to dry the
16 printed sheets between printing units before overprinting them.

17 Moreover, when utilizing lithographic printing inks, it
18 is necessary to frequently stop the press and wash the blanket.
19 Metallic ink in particular "piles" on the blanket and must be
20 washed frequently.

21 Objects of the Invention

22 Accordingly, the principal object of the present
23 invention is to provide improved inking/coating apparatus which is
24 capable of selectively applying ink or a coating material to a
25 plate on a plate cylinder or a coating material to a blanket on a
26 blanket cylinder of a printing press.

27 Another object of the present invention is to provide
28 inking/coating apparatus of the character described which is
29 extendable into inking/coating engagement with either a plate
30 cylinder or a blanket cylinder, and which is retractable to a non-
31 operative position to provide clear access to the cylinders of the
32 printing unit.

33 A related object of the present invention is to provide
34 inking/coating apparatus of the character described which is

1 capable of being used in an interstation position and does not
2 interfere with access to the press.

3 Yet another object of the present invention is to
4 provide inking/coating apparatus of the character described, which
5 can be moved from an operative inking/coating engagement position
6 to a non-operative, retracted position.

7 Still another object of the present invention is to
8 provide inking/coating apparatus of the character described, which
9 can be used for applying aqueous inks and coatings to a litho-
10 graphic printing plate or a flexographic printing plate in a
11 rotary offset press.

12 A related object of the present invention is to provide
13 inking/coating apparatus of the character described, which is
14 capable of applying aqueous coating at one printing unit and
15 drying the coating before it reaches the next printing unit where
16 it can be overprinted with aqueous ink or lithographic ink.

17 Another object of the present invention is to provide
18 inking/coating apparatus for use on a multiple color rotary offset
19 printing press that can apply ink or coating to the plate or
20 blanket of a printing unit from a single applicator head.

21 A related object of the invention is to provide
22 inking/coating apparatus of the character described, in which no
23 printing unit adjustment or alteration is required when the
24 applicator head is converted from plate to blanket operation and
25 vice versa.

26 Summary of the Invention

27 The foregoing objects are achieved by a retractable, in-
28 line inking/coating apparatus which is mounted on a printing unit
29 tower for pivotal, Ferris wheel type movement between an operative
30 inking/coating position and a retracted, overhead position. The
31 inking/coating apparatus includes an applicator head which extends
32 into and retracts out of engagement with a plate on a plate
33 cylinder or a blanket on a blanket cylinder. The inking/coating
34 applicator head is positioned in parallel alignment with either

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1 the plate cylinder or the blanket cylinder by a carriage assembly
2 which includes a cantilever support arm. The support arm is
3 pivotally coupled between the inking/coating head and the printing
4 unit tower. This cantilevered, pivotal mounting arrangement
5 allows the inking/coating unit to be used between two printing
6 units, as well as installed on the last printing unit of the
7 press.

8 In the preferred embodiment, the applicator head
9 includes vertically spaced pairs of cradle members with one cradle
10 pair being adapted for supporting a metal or ceramic coating
11 roller in alignment with a blanket cylinder, and the other cradle
12 pair supporting a resilient anilox coating roller in alignment
13 with the plate cylinder, respectively, when the applicator head is
14 in the operative position. Because of the cantilevered, pivotal
15 support provided by the support arm, the applicator head can be
16 lifted and lowered through an arc, similar to Ferris wheel
17 movement, in the limited space between adjacent printing units.
18 When fully retracted, the coater and carriage assembly are lifted
19 to an overhead position overlying the printing unit tower, thus
20 providing complete access to the printing unit cylinders, without
21 causing the printing unit to lose its printing capability. The
22 inking/coating applicator roller can be inspected, cleaned or
23 replaced and the doctor blade assembly can be washed-up automati-
24 cally while the inking/coating apparatus is in the fully retracted
25 position.

26 When the inking/coating apparatus is used in combination
27 with a flexographic printing plate and aqueous ink or aqueous
28 coating, the water component of the aqueous ink or coating on the
29 freshly printed sheet is evaporated by a high velocity, hot air
30 interstation dryer and a high volume heat and moisture extractor
31 assembly so that the freshly printed ink or coating is completely
32 dry before the sheet is printed on the next printing unit. This
33 quick drying flexographic printing/coating arrangement permits a
34 base coat of ink, for example opaque white or metallic ink (gold,
35 silver or other metallica) to be applied in the first printing

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1 unit, and then overprinted by the lithographic process on the next
2 printing unit.

3 Other features and advantages of the present invention
4 will become more apparent from the following detailed description
5 taken in conjunction with the accompanying drawings which
6 disclose, by way of example, the principles of the present
7 invention.

8 Brief Description of the Drawings

9 FIGURE 1 is a schematic side elevational view of a
10 sheet-fed, rotary offset printing press having inking/coating
11 apparatus embodying the present invention;

12 FIGURE 2 is a perspective view of the printing press of
13 FIGURE 1 in which a dual head inking/coating apparatus is in the
14 operative coating position and a single head coater is in a
15 retracted, overhead position;

16 FIGURE 3 is an enlarged simplified perspective view
17 showing one side of the single head inking/coating apparatus of
18 FIGURE 1 in the operative position;

19 FIGURE 4 is a simplified side elevational view showing
20 the dual head inking/coating apparatus in the operative coating
21 position for spot or overall coating from the blanket position;

22 FIGURE 5 is a simplified side elevational view showing
23 the single head inking/coating apparatus in the operative coating
24 position for spot or overall coating from the plate position; and,

25 FIGURE 6 is a simplified side elevational view of the
26 dual head inking/coating apparatus of FIGURE 4, partially broken
27 away, which illustrates the hydraulic drive assembly and doctor
28 blade assembly.

29 Detailed Description of the Preferred Embodiments

30 As used herein, the term "processed" refers to various
31 printing methods which may be applied to either side of a
32 substrate, including the application of UV-curable and aqueous
33 inks and/or coatings. The term "substrate" refers to sheet or web

1 material. Also, as used herein, the term "waterless printing
2 plate" refers to a printing plate having non-image surface areas
3 which are hydrophobic and also having image surface areas which
4 are hydrophilic, wherein the non-image surface areas are charac-
5 terized by a surface tension value which is less than the surface
6 tension of aqueous ink, and the image surface areas are character-
7 ized by a surface tension value which is greater than the surface
8 tension of aqueous ink. "Flexographic" refers to flexible
9 printing plates having a relief surface which is wettable by
10 aqueous ink or coating material.

As shown in the exemplary drawings, the present invention is embodied in a new and improved in-line inking/coating apparatus, herein generally designated 10, for use in applying inks or protective and/or decorative coatings to sheets or webs printed in a sheet-fed or web-fed, offset rotary or flexographic printing press, herein generally designated 12. In this instance, as shown in FIGURE 1, the inking/coating apparatus 10 is installed in a four color printing press 12, such as that manufactured by Heidelberger Druckmaschinen AG of the Federal Republic of Germany under its designation Heidelberg Speedmaster 102V (40"). The press 12 includes a press frame 14 coupled at one end, herein the right end, to a sheet feeder 16 from which sheets, herein designated S, are individually and sequentially fed into the press, and at the opposite end, with a sheet delivery stacker 20 in which the freshly printed sheets are collected and stacked. Interposed between the sheet feeder 16 and the sheet delivery stacker 20 are four substantially identical sheet printing units 22, 24, 26 and 28 which can print different color inks onto the sheets as they are transferred through the press 12. The printing units are housed within printing towers T1, T2, T3 and T4 formed by side frame members 14, 15.

32 As illustrated, the printing units 22, 24, 26 and 28 are
33 substantially identical and of conventional design. The first
34 printing unit 22 includes an in-feed transfer cylinder 30, a plate
35 cylinder 32, a blower cylinder 34 and an impression cylinder 36.

1 all supported for rotation in parallel alignment between the press
2 side frames 14, 15 which define printing unit towers T1, T2, T3
3 and T4. Each of the first three printing units 22, 24 and 26 have
4 a transfer cylinder 38 disposed to withdraw the freshly printed
5 sheets from the adjacent impression cylinder and transfer the
6 freshly printed sheets to the next printing unit via an inter-
7 station transfer cylinder 40. The last printing unit 28 is shown
8 equipped with a delivery cylinder 42 which supports the printed
9 sheet 18 as it is transferred from the last impression cylinder 36
10 to a delivery conveyor system, generally designated 44, to the
11 sheet delivery stacker 20.

12 The delivery conveyor system 44 as shown in FIGURE 2 is
13 of conventional design and includes a pair of endless delivery
14 gripper chains 46, only one of which is shown carrying at regular
15 spaced locations along the chains, laterally disposed gripper bars
16 having gripper fingers used to grip the leading edge of a freshly
17 printed sheet 18 after it leaves the nip between the delivery
18 cylinder 42 and impression cylinder 36 of the last printing unit
19 28. As the leading edge is gripped by the grippers, the delivery
20 chains 46 pull the sheet away from the impression cylinder 36 and
21 convey the freshly printed sheet to the sheet delivery stacker 20.

22 Prior to reaching the delivery sheet stacker, the
23 freshly printed and/or coated sheets S pass under a delivery dryer
24 48 which includes a combination of infra-red thermal radiation,
25 high velocity hot air flow and a high performance heat and
26 moisture extractor for drying the ink and/or the protec-
27 tive/decorative coating.

28 In the exemplary embodiment shown in FIGURE 1, the first
29 printing unit 22 is equipped with a flexographic printing plate,
30 and does not require an inking roller train or a dampening system.
31 If an ink roller train is mounted on the first printing unit, the
32 form rollers are retracted and locked off when the printing unit
33 goes on impression. Flexographic aqueous ink is supplied by the
34 inking/coating unit 110. The remaining printing units 24, 26 and
35 28 are equipped for lithographic printing and include an inking

1 apparatus 50 having an inking roller train 52 arranged to transfer
2 ink from an ink fountain 54 to the plate cylinder 32. This is
3 accomplished with the aid of a fountain roller 56 and a ductor
4 roller. The fountain roller 56 projects into the ink fountain 54,
5 whereupon its surface is wetted with ink. The printing ink Q is
6 transferred intermittently to the inking roller train 52 by the
7 ductor roller. The inking roller train 52 supplies ink Q to the
8 image areas of a printing plate P mounted on the plate cylinder 32.

9 The printing ink Q is transferred from the printing
10 plate P to an ink receptive blanket B which is mounted on the
11 blanket cylinder 34. The inked image carried on the blanket B is
12 transferred to a sheet S as the sheet is transferred through the
13 nip between the impression cylinder 36 and the blanket B.

14 The inking roller arrangement 52 illustrated in FIGURE
15 1 is exemplary for use in combination with lithographic ink
16 printing plates. It will be understood that dampening rollers
17 (not illustrated) will be in direct engagement with the litho-
18 graphic plate P, but are not used in combination with the
19 flexographic plate of printing unit 22.

20 Referring now to FIGURE 4, FIGURE 5 and FIGURE 6, the
21 in-line inking/coating apparatus 10 includes a carriage assembly
22 58 which supports an applicator head 60. The applicator head 60
23 includes a hydraulic motor 62, a lower gear train 64, an upper
24 gear train 65, an applicator roller 66 and a doctor blade assembly
25 68. The external peripheral surface of the applicator roller 66
26 is inserted into wetting contact with liquid coating material or
27 ink contained in a reservoir 70. The reservoir is continuously
28 supplied with ink or coating which is circulated through the
29 reservoir 70 from an off-press source by a pump (not illustrated).
30 The hydraulic motor 62 drives the applicator roller 66 synchro-
31 nously with the plate cylinder 32 and the blanket cylinder 34 in
32 response to an RPM control signal from the press drive (not
33 illustrated) and a feedback signal developed by a tachometer 72.
34 While a hydraulic drive motor is preferred, an electric drive
35 motor can be used.

1 The fluid metering applicator 66 is preferably an anilox
2 roller which transfers measured amounts of printing ink or coating
3 material onto the printing plate or blanket. The surface of an
4 anilox roller is engraved with an array of closely spaced, shallow
5 depressions referred as "cells". Ink or coating from the
6 reservoir 70 flows into the cells as the anilox roller turns
7 through the reservoir. The transfer surface of the anilox roller
8 is scraped with a doctor blade 73 to remove excess ink or coating.
9 The ink or coating remaining on the anilox roller is that
10 contained within the cells.

11 The anilox roller 66 is cylindrical and may be con-
12 structed in various diameters and lengths, containing cells of
13 various sizes and shapes. The volumetric capacity of an anilox
14 roller is established during manufacturing and is dependent upon
15 the selection of cell size, shape and number of cells per unit
16 area. Depending upon the intended application, the cell pattern
17 may be fine (many small cells per square inch) or coarse (fewer
18 larger cells per square inch).

19 By applying the ink or coating through the inking/coat-
20 ing applicator 60, more ink or coating can be delivered to the
21 sheet S as compared with the inking roller train of a lithographic
22 printing unit. Moreover, color intensity is stronger and more
23 brilliant because the flexographic ink is applied at a much larger
24 film thickness than can be applied by the lithographic process and
25 is not diluted by dampening solution.

26 Preferably, the doctor blade assembly 68 is constructed
27 as described in U.S. Patent 5,176,077 (DeMoore), which is
28 incorporated herein by reference.

29 The applicator head 60 includes side frame members 74,
30 76 which support the applicator roller 66, gear train 64, gear
31 train 65, doctor blade assembly 68 and the drive motor 62. The
32 applicator roller 66 is supported at opposite ends on a lower
33 cradle formed by a pair of end plates 78, 80 which hold the
34 applicator roller 66 in parallel alignment with the blanket
35 cylinder 34 (FIGURE 5). The side frame 74, 76 are also provided

with an upper cradle formed by a pair of side plates 82, 84 which are vertically spaced with respect to the lower side plates 78, 80. Each cradle has a pair of sockets 79, 81 and 83, 85, respectively, for holding an applicator roller 66 for spot coating or inking engagement against the plate P of the plate cylinder 32 (FIGURE 4) or the blanket B of the blanket cylinder 34.

Preferably, the applicator roller 66 for the upper cradle (plate) position is an anilox roller having a resilient transfer surface. In the dual cradle arrangement, the press operator can quickly change over from blanket inking/coating and plate inking/coating with minimum press down time, since it is only necessary to remove and reposition or replace the applicator roller 66, and wash-up the doctor blade assembly if changing from ink to coating or vice versa. The capability to selectively operate in either the flexographic mode or the lithographic mode and to print or coat from either the plate or blanket position is referred to herein as the "LITHOFLEX" process.

According to an important feature of the present invention, the applicator head 60 is supported by the carriage assembly 58 in a cantilevered, pivotal arrangement which allows the dual cradle inking/coating apparatus 10 and single cradle inking/coating apparatus 110 to be installed and used between any two adjacent printing units, as well as installed on the first and last printing units of the press. This is made possible by a pair of cantilevered support arms 88, 90 which are pivotally coupled to the side plates 74, 76, respectively, on a pivot shaft 77. Each support arm has a hub portion 88A, 90A, respectively and an elongated shank portion 88B, 90B, respectively. The elongated shank portion extends transversely with respect to the shank portion, and preferably extend perpendicularly with respect to each other.

The cantilevered support arms are pivotally mounted on the printing tower by pivot blocks 92, 94, respectively. The hub portions 88A, 90A are journaled for rotation on pivot shafts 96, 98, respectively. The pivot blocks 92, 94 are securely fastened

1 to the tower 14D, so that the carriage assembly 86 is pivotally
2 suspended from the pivot shafts 96, 98 in a cantilevered Ferris
3 support arrangement. The shank portions 88B, 90B are pivotally
4 coupled to the pivot shaft 77, so that the carriage assembly 58
5 and the applicator head 60 are capable of independent rotation
6 with respect to each and with respect to the pivot shaft 77. By
7 this arrangement, the applicator head 60 is pivotally suspended
8 from the pivot shaft 77, and remains in an upright orientation as
9 the support arms rotate from the operative position to the fully
10 retracted position and vice versa.

1 Thus, the cradles 78, 80 and 82, 84 position the
2 applicator roller 66 in vertical and horizontal alignment with the
3 plate cylinder or blanket cylinder when the applicator head is
4 extended to the operative position. Moreover, because of the
5 transverse relationship between the hub portion and shank portion
6 of the support arms, the applicator head 60 and carriage assembly
7 58 are capable of rotating through a Ferris arc without touching
8 the adjacent tower. This makes it possible to install the
9 inking/coating apparatus 10 on any intermediate printing unit
10 tower (T2, T3), and as well as the first printing unit tower T1
1 and the last printing unit tower T4. Additionally, because of the
2 transverse relationship of the support arm hub portion and shank
3 portion, the lateral projection of the applicator head 60 into the
4 interstation space between printing units is minimized, thus
5 assuring virtually unrestricted operator access in the inter-
6 station space between adjacent printing units when the applicator
7 head is engaged in the operative position, and completely
8 unrestricted access when the applicator head is completely
9 retracted.

1 As shown in FIGURE 1 and FIGURE 2, rotation of the
2 carriage assembly 58 is counterclockwise from the retracted
3 position (shown in phantom) to the operative position. The
4 carriage assembly can be adapted for clockwise rotation from the
5 retracted position to the operative position for engagement of the
6 applicator roller to either the plate cylinder or the blanket

cylinder on the dampener side of the tower, assuming that access to the plate and blanket is not restricted by dampener rollers or the like.

Rotational movement of the support arms 88, 90 is assisted by counterweights 100, 102 which are secured to the support arms, respectively, for concurrent rotation with respect to the pivot blocks 92, 94. With the passive assistance of the counterweights, the press operator can easily move the inking/coating assembly 10 from the engaged operative position as shown in FIGURE 4 to the fully retracted idle position as shown in phantom in FIGURE 1. Preferably, rotation of the carriage assembly 58 is assisted by power means such as a torsion spring, electric motor, or hydraulic motor.

The inking/coating apparatus 10 is releasably locked into the engaged position as shown in FIGURE 4 by releasable latch couplings 103, 105 which secure the support arms 88, 90 to the press side frames 14, 15, respectively, of the printing unit tower T4 in the operative position. Coating engagement of the applicator roller 66 against the blanket cylinder 34 is produced by power actuators, preferably pneumatic cylinders 104, 106 which have extendable/retractable power transfer arms 104A, 106A, respectively. The pneumatic cylinder 104 is pivotally coupled to the support arm 88 by a pivot linkage 108, and the second pneumatic cylinder 106 is pivotally coupled to the support arm 90 by a pivot linkage 109. In response to actuation of the pneumatic cylinders 104, 106, the power transfer arms are retracted. As the arms retract, the inking/coating head 60 is rotated counterclockwise on the pivot shaft 77, thus moving the applicator roller 66 into coating engagement with the blanket cylinder 34.

The pivot linkage 108 includes a bell crank 111 which is mounted for pivotal movement on a pin 113. The pin 113 is supported by a clevis plate 115 which is attached to the support arm 88. One end of the bell crank is pivotally coupled to the actuator arm 104A, and a cam roller 117 is mounted for rotation on its opposite end.

1 The cam roller 117 is engagable against an adjustable
2 stop 119 which is rigidly secured to the side plate 74. Counter-
3 clockwise shifting of the handle H moves a cam follower 121 into
4 a latch pocket 123 of a receiver block 125 as the cam roller 117
5 is moved into engagement with the adjustable stop 119 in the
6 interlocked, operative position. Referring to FIGURE 4, FIGURE 5
7 and FIGURE 6, the receiver block is rigidly secured to the
8 delivery side face of the printing unit tower by machine screws.

9 When the plate P goes on impression, power is applied to
10 the pneumatic actuator 104 and the power transfer arm 104A
11 retracts, thus causing the bell crank 111 to rotate counterclock-
12 wise about the pin 113. The torque applied by the actuator is
13 transmitted to the applicator head 60 through the cam roller 117
14 and the adjustable stop 119. Counterclockwise movement of the
15 applicator head 60 relative to the support shaft 77 carries the
16 applicator roller 66 into engagement with the plate P.

17 The adjustable stop 119 has a threaded bolt 119A which
18 is engagable with the cam roller 117. The striking point of
19 engagement is preset so that the applicator roller 66 is properly
20 positioned for engagement with the plate P or blanket B when the
21 applicator head 60 is interlocked with the press frame 14 and the
22 printing unit goes on impression.

23 Referring to FIGURE 5, an inking/coating apparatus 110
24 having a single head is illustrated. The construction of this
25 alternative embodiment is identical in all respects with the dual
26 head arrangement, with the exception that only a single gear train
27 and a single cradle for holding the applicator roller is provided.
28 In both embodiments, the inking/coating head 60 remains upright as
29 it swings through an arc, similar to the movement of a Ferris
30 wheel. Because of the upright orientation of the inking/coating
31 head 60 as it moves between the extended and retracted positions,
32 the usual platform spacing between printing unit towers provides
33 adequate clearance to permit extension and retraction of the
34 carriage assembly 58 without interference with operator access to
35 the printing units. This is a significant advantage in that it

1 permits the in-line inking/coating apparatus to operate effective-
 2 ly in the interstation space between any adjacent printing units,
 3 and without blocking or obstructing access to the cylinders of the
 4 printing units when the inking/coating apparatus is in the fully
 5 retracted position as indicated in FIGURE 1.

6 Moreover, when the in-line inking/coating apparatus is
 7 in the fully retracted position, the applicator roller 66 is
 8 conveniently positioned on the dampener side of the printing unit
 9 for inspection, clean-up or removal. Additionally, the doctor
 10 blade assembly is also conveniently positioned for inspection,
 11 removal, adjustment or clean-up. The doctor blade reservoir and
 12 coating circulation lines can also be cleaned while the printing
 13 unit is running as well as when the press has been stopped for
 14 change-over from one type of ink or coating to another.

15 When the inking/coating apparatus is used for applying
 16 an aqueous ink or an aqueous coating material, the water component
 17 on the freshly printed sheet S is evaporated by a high velocity,
 18 hot air interstation dryer and high volume heat and moisture
 19 extractor units 112 and 114, as shown in FIGURE 1, FIGURE 4 and
 20 FIGURE 5. The dryer/extractor units 112 and 114 are oriented to
 21 direct high velocity heated air onto the freshly printed/coated
 22 sheet as it is transferred by the impression cylinder 36 and the
 23 intermediate transfer cylinder 40. By this arrangement, the
 24 freshly printed aqueous ink or coating is completely dry before
 25 the sheet is overprinted in the next printing unit.

26 The high velocity, hot air dryer and high performance
 27 heat and moisture extractor units 112, 114 utilize high velocity
 28 air jets which scrub and break-up the moist air level which clings
 29 to the surface of each freshly printed sheet. Within each dryer,
 30 high velocity air is heated to a high temperature as it flows
 31 across a resistance heating element within an air delivery baffle
 32 tube. High velocity jets of hot air are discharged through
 33 multiple airflow apertures through an exposure zone Z (FIGURE 4
 34 and FIGURE 5) onto the freshly printed/coated sheet S as it is
 35 transferred by the impression cylinder 36 and transfer cylinder

40, respectively. Each dryer assembly includes a pair of air delivery dryer heads which are arranged in spaced, side-by-side relation. The high velocity, hot air dryer and high performance heat and moisture extractor units 112, 114 are preferably constructed as disclosed in co-pending U.S. Patent Application serial No. 08/132,584, filed October 6, 1993, entitled "High Velocity Hot Air Dryer", assigned to the assignee of the present invention and which is incorporated herein by reference.

The high velocity, hot moisture-laden air displaced from each printed sheet is extracted from the dryer exposure zone Z and completely exhausted from the printing unit by the high volume extractors. Each extractor head includes a manifold coupled to the dryer heads and draws the moisture, volatiles and high velocity hot air through a longitudinal gap between the dryer heads. According to this arrangement, each printed sheet is dried before it is run through the next printing unit.

The water-based inks used in flexographic printing dry at a relatively moderate drying temperature provided by the interstation high velocity hot air dryers/extractors 112, 114. Because each freshly printed sheet is dried between each printing unit, clarity and print quality are substantially improved since the aqueous ink is dried at each printing unit before it enters the next printing unit. Since the aqueous ink is dry before the sheet enters the next printing unit, back-trapping on the blanket of the next printing unit is completely eliminated. This interstation drying arrangement makes it possible to print aqueous inks such as metallic ink and opaque white ink at one printing unit, and then overprint at the next printing unit.

Moreover, this arrangement permits the first printing unit to be used as a coater in which an aqueous coating is applied to low grade paper such as recycled paper to trap and seal in lint, dust, spray powder and other debris and provide a smoother, durable surface which is overprinted in the next printing unit. An UV-curable coating can be applied over the first down overprinted (aqueous) coating in the last printing unit. The first

down layer seals the surface of the low grade, rough substrate and improves overprinted dot definition while preventing strike-through and show-through.

Preferably, the applicator roller 66 is either metal or ceramic when it is used for applying a coating material to the blanket B on the cylinder 34. When the applicator roller 66 is applied to the plate, it is preferably constructed as an anilox roller having a resilient transfer surface for engaging a flexographic printing plate. Suitable resilient roller surface materials include Buna N synthetic rubber and EPDM (terpolymer elastomer).

It will be appreciated that the inking/coating apparatus 10 is capable of applying a wide range of ink types, including fluorescent (Day Glo), pearlescent, metallics (gold, silver and other metallics), glitter, scratch and sniff (micro-encapsulated fragrance), scratch and reveal, luminous, pressure-sensitive adhesives and the like.

The press operator can eliminate the dampener roller assembly altogether, and the inking/coating apparatus 10 can selectively apply aqueous inks and coatings to a flexographic or waterless printing plate and the blanket. Moreover, overprinting of the aqueous inks and coatings can be carried out in the next printing unit since the aqueous inks and coatings are completely dried by the high velocity, hot air interstation dryer and high volume heat and moisture extractor assembly of the present invention.

The aqueous inks and coatings as used in the present invention contain colored pigments and/or soluble dyes, binders which fix the pigments onto the surface of the printed sheet and waxes, defoamers and thickeners. Aqueous printing inks predominantly contain water as a solvent, diluent and/or vehicle. The thickeners which are preferred include algonates, starch, cellulose and its derivatives, for example cellulose esters or cellulose ethers and the like. Coloring agents including organic as well as inorganic pigments may be derived from dyes which are

insoluble in water. Also, the printing ink may contain water and may be predominantly glycol or the like, with the pigment being bound by an appropriate resin. When metallic inks are printed, the cells of the anilox roller must be appropriately sized to prevent the metal particles from getting stuck within the cells. The cell size is critical, and for metallic gold ink, the anilox roller should have a screen line count in the range of 175-300 lines per inch.

The inking/coating apparatus 10 can also apply UV-curable inks and coatings. If UV-curable inks and coatings are utilized, ultra-violet dryers/extractors are installed adjacent the high velocity hot air dryer/extractor units 112, 114, respectively.

Moreover, by utilizing the coating apparatus on the first printing unit, a seal coating can be applied to trap lint, spray powder, dust and other debris, and cover defects on lower grade paper which will improve print quality, which can then be overprinted on the next in-line printing unit.

It will be appreciated that the "LITHOFLEX" system described herein makes it possible to selectively operate a printing unit in either the flexographic printing mode or the lithographic printing mode, while also providing the capability to print or coat from either the plate or blanket position. The dual cradle support arrangement of the present invention makes it possible to quickly change over from inking/coating at the blanket cylinder position to inking/coating at the plate cylinder position with minimum press down-time, since it is only necessary to remove and reposition or replace the applicator roller 66 while the printing/inking apparatus is in the retracted position.

Moreover, the press operator may elect to spot or overall coat with aqueous ink/coating from the plate for one job, and then spot and/or overall coat from the blanket during the next job. Since the doctor blade assembly can be flushed and washed-up quickly and the applicator roller can be changed out quickly, it is possible to spot coat or overall coat from the plate position

1 or the blanket position with aqueous inks or coatings during the
2 first press run and then spot coat or overall coat with UV-curable
3 inks or coatings from the plate position or from the blanket
4 position during the next press run. The inking/coating apparatus
5 is completely out of the way in the retracted position; conse-
6 quently, the doctor blade reservoir and supply lines may be
7 flushed and washed-up by automatic wash-up equipment while the
8 printing unit is printing another job.

9 The positioning of the applicator head and roller
10 assembly relative to the plate and blanket is repeatable to a pre-
11 determined, preset impression position. Consequently, no printing
12 unit adjustment or alteration is required, except for flushing the
13 doctor blade assembly and cleaning or replacing the applicator
14 roller to accommodate a different kind of ink or coating.
15 Although manual extension and retraction have been described in
16 connection with the exemplary embodiment, extension to the
17 operative position and retraction to a non-operative position can
18 be carried out automatically by hydraulic or electric motor
19 servomechanisms.

20 The cantilevered, Ferris wheel support arrangement
21 allows the inking/coating apparatus to operate effectively in the
22 interstation space between any adjacent printing units, as well as
23 on the first or last printing units of the press, without blocking
24 or obstructing the interstation space or restricting operator
25 access to the cylinders of any of the printing units.

26 Finally, because the inking/coating apparatus of the
27 present invention is mounted on a printing unit tower and is
28 extendable to the operative position without requiring adjustment
29 or alteration of the printing unit cylinders, it can be used for
30 applying ink or coating to the blanket cylinder of a rotary offset
31 web press, or to the blanket of a dedicated coating unit.

32 Although the present invention and its advantages have
33 been described in detail, it should be understood that various
34 changes, substitutions and alterations may be made herein without

[illegible]

What is claimed is:

Sub 2
21

1. In a printing press of the type having side frame members forming a printing unit tower on which a plate cylinder and blanket cylinder are supported for rotation, the improvement comprising:

inking/coating apparatus for applying ink or coating material to a plate mounted on the plate cylinder or to a blanket mounted on the blanket cylinder when the inking/coating apparatus is in an operative position; and,

a carriage assembly including a support arm having a first end portion pivotally coupled to the printing unit tower and a second end portion pivotally coupled to the inking/coating apparatus, the carriage assembly being movable to an operative position in which the inking/coating apparatus is suspended laterally adjacent to the plate and blanket cylinders, and being movable to a retracted position in which the inking/coating apparatus is elevated with respect to the plate and blanket cylinders.

2. The invention as set forth in claim 1, wherein the inking/coating apparatus comprises:

a doctor blade assembly having a reservoir for receiving ink or liquid coating material;

an applicator roller coupled to the doctor blade assembly in fluid communication with the reservoir, the applicator roller being engagable with a printing plate on the plate cylinder or with a blanket on the blanket cylinder when the inking/coating apparatus is in the operative position.

3. The invention as set forth in claim 2, the applicator roller comprising:

an anilox roller having a resilient transfer surface.

4. The invention as set forth in claim 1, including a counterweight coupled to the support arm.

1 5. The invention as set forth in claim 1, further
2 comprising:

3 a power actuator pivotally coupled to the support
4 arm, the power actuator having a power transfer arm which is
5 extendable and retractable; and,

6 apparatus coupled to the power transfer arm for
7 converting extension or retraction movement of the power transfer
8 arm into pivotal movement of the inking/coating apparatus relative
9 to the support arm.

Sub A2
1 6. The invention as set forth in claim 5, in which the
2 movement converting apparatus comprises:

3 a bell crank plate having a first end portion
4 coupled to the power transfer arm and having a second end portion
5 for engaging a stop member;

6 a stop member secured to the inking/coating
7 apparatus; and,

8 a clevis plate secured to the support arm and
9 pivotally coupled to the bell crank plate.

1 7. The invention as set forth in claim 1, the
2 inking/coating apparatus comprising:

3 an applicator head having first and second side
4 frame members pivotally coupled to the carriage assembly;

5 a doctor blade assembly mounted between the first
6 and second side frame members, the doctor blade assembly including
7 a reservoir for receiving ink or liquid coating material;

8 cradle means mounted on the first and second side
9 frame members, respectively;

10 an applicator roller mounted for rotation on the
11 cradle means and coupled to the doctor blade assembly for rolling
12 contact with ink or coating material in the reservoir, the

13 applicator roller being engagable with a printing plate on the
14 plate cylinder or with a blanket on the blanket cylinder in the
15 operative position; and,

16 motor means coupled to the applicator roller for
17 rotating the applicator roller.

1 8. The invention as set forth in claim 7,
2 the cradle means including first and second sockets
3 disposed on the first and second side frame members respectively;
4 and,

5 the applicator roller being mounted for rotation on
6 the first and second sockets.

1
2 *Sub A3*
3 9. The invention as set forth in claim 7,
4 the cradle means including first and second sockets
5 disposed on the first and second side frame members, respectively,
6 and third and fourth sockets disposed on the first and second side
7 frame members, respectively;
8 the applicator roller being mountable for rotation
9 on the first and second sockets for applying ink or coating
10 material to the plate when the carriage assembly is in the
11 operative position; and,
12 the applicator roller being mountable for rotation
13 on the third and fourth sockets for applying ink or coating
material to the blanket when the carriage assembly is in the
operative position.

1 10. The invention as set forth in claim 1, comprising:
2 male and female latch coupling members mounted on
3 the carriage assembly and on the printing unit tower, respective-
4 ly, for releasably latching the carriage assembly in interlocking
5 engagement with the printing unit tower in the operative position.

1 11. The invention as set forth in claim 1, wherein the
2 support arm comprises an elongated shank portion and a hub portion

3 which extends transversely with respect to the shank portion, the
4 elongated shank portion being pivotally coupled to the ink-
5 ing/coating apparatus and the hub portion being pivotally coupled
6 to the printing unit tower.

Sub A4
12. A sheet-fed, rotary offset printing press comprising, in combination:

3 at least one printing unit or dedicated coating
4 unit having side frame members forming a tower;

5 at least one cylinder mounted for rotation on the
6 tower for printing ink or coating material onto sheets passing
7 through the printing unit or dedicated coating unit;

8 inking/coating apparatus including a doctor blade
9 assembly having a reservoir for holding ink or coating liquid, a
10 rotatable applicator roller and means for applying ink or coating
11 liquid from the reservoir onto a peripheral surface portion of the
12 applicator roller; and,

13 support apparatus mounted on the printing unit
14 tower for pivotal movement, said support apparatus being movably
15 coupled to the inking/coating apparatus for supporting the
16 inking/coating apparatus for movement to an operative position in
17 which the applicator roller is engagable with a plate or a blanket
18 on the cylinder, and for movement to a retracted position in which
19 the inking/coating apparatus is supported at an elevated position
20 above the cylinder.

1 13. A rotary offset printing press comprising, in
2 combination:

3 a plate cylinder having a printing plate mounted
4 thereon;

5 a blanket cylinder having an ink receptive blanket
6 disposed in ink transfer engagement with the plate cylinder for
7 transferring ink from the image surface areas of the printing
8 plate to the ink receptive blanket;

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9 an impression cylinder disposed adjacent the
10 blanket cylinder thereby defining a nip between the impression
11 cylinder and the blanket whereby the printing ink is transferred
12 from the blanket to a substrate as the substrate is transferred
13 through the nip;

14 inking/coating apparatus for applying ink or
15 coating material to the plate or to the blanket;

16 support apparatus mounted on the printing press for
17 pivotal movement, said support apparatus being movably coupled to
18 the coating apparatus for supporting the inking/coating apparatus
19 for movement to an operative position in which the inking/coating
20 apparatus is engagable with the plate or the blanket, and for
21 movement to a retracted position in which the inking/coating
22 apparatus is supported at an elevated position above the press;
23 and,

24 a dryer mounted on the press for discharging heated
25 air on the freshly printed substrate.

1 14. A rotary offset printing press as defined in claim
2 13, wherein:

3 the dryer is mounted adjacent the impression
4 cylinder for discharging heated air onto a freshly printed
5 substrate while the substrate is in contact with the impression
6 cylinder.

1 15. A rotary offset printing press as defined in claim
2 13, comprising:

3 an extractor coupled to the dryer for extracting
4 hot air, moisture and volatiles from an exposure zone between the
5 dryer and the freshly printed substrate.

1 16. A rotary offset printing press as defined in claim
2 13, comprising:

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3 a transfer cylinder disposed in an interstation
4 position on the press and coupled in sheet transfer relation with
5 the impression cylinder; and,

6 an interstation dryer disposed adjacent the
7 transfer cylinder for discharging heated air onto a freshly
8 printed or coated substrate after it has been transferred from the
9 impression cylinder and while it is in contact with the inter-
10 mediate transfer cylinder.

Sub A5

17. In a printing press of the type having side frame
members forming a tower on which a blanket cylinder is supported
for rotation, the improvement comprising:

4 inking/coating apparatus for applying ink or
5 coating material to a blanket mounted on the blanket cylinder when
6 the inking/coating apparatus is in an operative position; and,

7 a carriage assembly movably coupled to the tower
8 and to the inking/coating apparatus for producing Ferris wheel
9 movement of the inking/coating apparatus to the operative position
10 in which the inking/coating apparatus is suspended laterally
11 adjacent to the blanket cylinder, and to a retracted position in
12 which the inking/coating apparatus is elevated with respect to the
13 blanket cylinder.

18. The invention as set forth in claim 17, wherein the
tower includes a plate cylinder and a plate mounted on the plate
cylinder, the inking/coating apparatus including:

4 first cradle means for supporting an applicator
5 roller for engagement against the plate when the inking/coating
6 apparatus is in the operative position; and,

7 second cradle means for supporting an applicator
8 roller for engagement against the blanket when the inking/coating
9 apparatus is in the operative position.

TOP SECRET

1 19. The invention as set forth in claim 17, comprising:
2 said carriage assembly including a support arm
3 having a first end portion pivotally coupled to the tower and
4 having a second end portion;

5 a common pivot shaft on which the support arm
6 second end portion and the inking/coating apparatus are pivotally
7 mounted; and,

8 male and female latch members coupled between the
9 common pivot shaft and the tower, with one of the latch members
10 being secured to the common pivot shaft and the other latch member
11 being secured to the tower, the latch members being mateable in
12 interlocking engagement when the inking/coating apparatus is in
13 the operative position.

1 20. The invention as set forth in claim 17, further
2 comprising:

3 a power actuator pivotally coupled to the support
4 arm, the power actuator having a power transfer arm which is
5 extendable and retractable; and,

6 apparatus coupled to the power transfer arm for
7 converting extension or retraction movement of the power transfer
8 arm into pivotal movement of the inking/coating apparatus relative
9 to the common pivot shaft.

Sub A6
1 21. The invention as set forth in claim 20, in which
2 the movement converting apparatus comprises:

3 a bell crank plate having a first end portion
4 coupled to the power transfer arm and having a second end portion
5 for engaging a stop member;

6 a stop member secured to the inking/coating
7 apparatus; and,

8 a clevis plate secured to the support arm and
9 pivotally coupled to the bell crank plate.

1 22. The invention as set forth in claim 1, wherein the
2 inking/coating apparatus comprises:

3 an applicator roller having a resilient transfer
4 surface.

1 23. The invention as set forth in claim 1, wherein the
2 applicator roller is mounted for engagement to a plate in the
3 plate cylinder position, the applicator roller comprising an
4 anilox roller having a resilient transfer surface.

1 24. A method for rotary offset printing in a rotary
2 offset press of the type including first and second printing
3 units, and using aqueous or UV-curable printing ink or coating
4 material in the operation of at least the first printing unit,
5 comprising the following steps performed at each printing unit in
6 succession:

7 spot or overall coating with aqueous ink/aqueous
8 coating or UV-curable ink/UV-curable coating from the plate;

9 spot and/or overall coating the blanket with
10 aqueous ink/aqueous coating or UV-curable ink or UV-curable
11 coating from the blanket;

12 transferring the printing ink or coating from the
13 printing plate to the blanket;

14 transferring the printed image from the blanket to
15 a substrate as the substrate is transferred through the nip
16 between an impression cylinder and the blanket; and,

17 drying the ink or coating on the freshly printed
18 substrate before the substrate is processed in the second printing
19 unit.

1 25. A method for rotary offset printing as defined in
2 claim 24,

3 wherein the drying step is performed by discharging
4 hot air onto the freshly printed/coated substrate after it has
5 been transferred from the first printing unit and while it is

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6 contact with an intermediate transfer cylinder, but before it is
7 processed in the second printing unit.

1 26. A method for rotary offset printing as defined in
2 claim 24,

3 wherein the drying step is performed by directing
4 high velocity, heated air onto the freshly printed/coated
5 substrate while the freshly printed/coated substrate is in contact
6 with an impression cylinder.

1 27. A method for rotary offset printing as defined in
2 claim 24, including the steps:

3 transferring the freshly printed substrate to an
4 intermediate transfer cylinder; and,

5 drying the freshly printed substrate while it is in
6 contact with the intermediate transfer cylinder.

1 28. A method for rotary offset printing as defined in
2 claim 24, including the step:

3 extracting hot air, moisture and volatiles from an
4 exposure zone above the freshly printed/coated substrate while the
5 freshly printed/coated substrate is in contact with the impression
6 cylinder.

1 29. A method for rotary offset printing as defined in
2 claim 24, including the steps:

3 applying a primer coating of an aqueous coating
4 material or UV-curable coating material to a substrate in the
5 first printing unit;

6 trapping and sealing dust, lint, spray powder and
7 other debris under the primer coating; and,

8 drying the primer coating on the substrate before
9 the substrate is overprinted in the second printing unit.

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1 30. A method for rotary offset printing in a rotary
2 offset press of the type including first and second printing
3 units, and using aqueous or UV-curable printing ink/coating
4 material in the operation of at least the first printing unit
5 comprising the following steps performed at each printing unit in
6 succession:

7 transferring the printing ink/coating material to
8 a printing plate at the first printing unit;

9 transferring the printing ink/coating material from
10 the printing plate to a blanket;

11 transferring the printed image from the blanket to
12 a substrate as the substrate is transferred through the nip
13 between an impression cylinder and the blanket; and,

14 drying the printing ink on the freshly printed
15 substrate before the substrate is processed in the second printing
16 unit.

1 31. A method for rotary offset printing as defined in
2 claim 30,

3 wherein the drying step is performed by discharging
4 hot air onto the freshly printed substrate after it has been
5 transferred from the first printing unit and while it is in
6 contact with an intermediate transfer cylinder, but before it is
7 processed in the second printing unit.

1 32. A method for rotary offset printing as defined in
2 claim 30, wherein the drying step is performed by directing high
3 velocity, heated air onto the freshly printed substrate while the
4 freshly printed substrate is in contact with the impression
5 cylinder.

1 33. A method for rotary offset printing as defined in
2 claim 30, including the steps:

3 transferring the freshly printed substrate to an
4 intermediate transfer cylinder; and,

5 drying the freshly printed substrate while it is in
6 contact with the intermediate transfer cylinder.

1 34. A method for rotary offset printing as defined in
2 claim 30, including the step:
3 extracting hot air, moisture and volatiles from an
4 exposure zone above the substrate while the substrate is in
5 contact with the impression cylinder.

TOP SECRET

"RETRACTABLE INKING/COATING APPARATUS
HAVING FERRIS MOVEMENT BETWEEN PRINTING UNITS"

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Abstract of the Disclosure

1 A retractable in-line inking/coating apparatus selec-
2 tively applies either spot or overall ink/coating to a blanket or
3 flexographic plate on a blanket cylinder or spot coating or
4 overall ink/coating to a flexographic printing plate on a plate
5 cylinder in a rotary offset printing press. The inking/coating
6 apparatus is pivotally mounted on the tower of a printing unit or
7 dedicated coating unit, and is extended into and retracted out of
8 inking/coating engagement by a carriage assembly which is
9 pivotally coupled to the printing unit tower. Because of the
10 pivotal support provided by a cantilevered support arm, the
11 inking/coating apparatus can be raised and lowered through a
12 Ferris wheel arc movement between adjacent printing units. The
13 aqueous component of the printing ink or coating is evaporated by
14 a high velocity, hot air interstation dryer and a high performance
15 heat and moisture extractor so that the ink on a freshly printed
16 sheet is dry before the sheet is printed on the next printing
17 unit. Thus, flexographic ink or coating applied at the first
18 printing unit can immediately be overprinted on subsequent
19 printing units.

* * * * *

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PATENT

JOINT
UTILITY

Attorney Docket
No. B6012

DECLARATION AND POWER OF ATTORNEY

We, RONALD M. RENDLEMAN, HOWARD W. DEMOORE, JOHN W. BIRD, joint inventors herein, hereby declare that:

Our residence, post office address and citizenship are as stated below next to our names.

We believe that we are the original, first and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled

"RETRACTABLE INKING/COATING APPARATUS HAVING
FERRIS MOVEMENT BETWEEN PRINTING UNITS",

the specification of which is attached hereto.

We hereby state that we have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to in this declaration.

We each individually acknowledge the duty to disclose to the U.S. Patent Office all information known to me that is material to the patentability of any claim in accordance with Title 37, Code of Federal Regulations, §1.56, and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent.

We hereby claim foreign priority benefits under Title 35, United States Code §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

<u>Country</u>	<u>Application No.</u>	<u>Filing Date</u> <u>(day, month, year)</u>
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- NONE -

We hereby claim the benefit under Title 35, United

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states Code §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, we acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

<u>U.S. Serial No.</u>	<u>U.S. Filing Date</u>	<u>Status</u>
------------------------	-------------------------	---------------

- NONE -

We hereby appoint DENNIS T. GRIGGS, Registration No. 27,790, of the firm of AKIN, GUMP, STRAUSS, HAUER & FELD, L.L.P., our attorney to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith. We request that all correspondence be addressed to:

Dennis T. Griggs
Akin, Gump, Strauss, Hauer & Feld, L.L.P.
1700 Pacific Avenue, Suite 4100
Dallas, Texas 75201-4618

Phone: 214/969-2747

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issued thereon.

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Residence: Dallas, Texas TX

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Ronald M. Rendleman
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Date: May 1, 1995 Howard W. DeMoore
Howard W. DeMoore

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John W. Bird

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FORM 962-5750



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Attorney Docket No.

B6012



SMALL ENTITY
INDEPENDENT INVENTOR

THE UNITED STATES PATENT AND TRADEMARK OFFICE

DECLARATION CLAIMING SMALL ENTITY STATUS
(37 C.F.R. §1.9(f) and §1.27 (b)) - INDEPENDENT INVENTOR

I, RONALD M. RENDLEMAN, hereby declare that I qualify as an independent inventor as defined in 37 C.F.R. §1.9(c) for the purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the U.S. Patent and Trademark office with regard to the invention entitled

"RETRACTABLE INKING/COATING APPARATUS HAVING
FERRIS MOVEMENT BETWEEN PRINTING UNITS"

X in the application filed herewith.

_____ in U.S. application Serial No. _____ filed
_____.

_____ patent No. _____, issued _____.

I have not assigned, granted, conveyed or licensed, and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 C.F.R. §1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 C.F.R. §1.9(d) or a non-profit organization under 37 C.F.R. §1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under any obligation under contract or law to assign, grant, convey, or license any rights in the invention is identified below:

_____ no such person, concern or organization exists.

X any such person, concern or organization is identified below, if applicable:

Full Name Howard W. DeMoore

Address 10954 Shady Trail

Dallas, Texas 75220

☒ individual

☐ small business concern

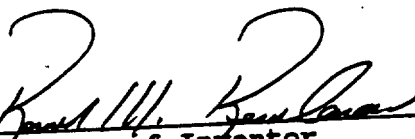
☐ nonprofit organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate pursuant to 37 C.F.R. §1.28(b).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Printed Name of Inventor: Ronald M. Rendleman

Date: 5/1/95


Signature of Inventor



Attorney Docket No.

B6012

SMALL ENTITY
INDEPENDENT INVENTOR

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

DECLARATION CLAIMING SMALL ENTITY STATUS
(37 C.F.R. §1.9(f) and §1.27 (b)) - INDEPENDENT INVENTOR

I, HOWARD W. DEMOORE, hereby declare that I qualify as an independent inventor as defined in 37 C.F.R. §1.9(c) for the purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the U.S. Patent and Trademark Office with regard to the invention entitled

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I have not assigned, granted, conveyed or licensed, and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 C.F.R. §1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 C.F.R. §1.9(d) or a non-profit organization under 37 C.F.R. §1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under any obligation under contract or law to assign, grant, convey, or license any rights in the invention is identified below:

_____ no such person, concern or organization exists.

X any such person, concern or organization is identified below, if applicable:

Full Name Printing Research, Inc.

Address 10954 Shady Trail

Dallas, Texas 75220

☐ individual ☒ small business concern

☐ nonprofit organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate pursuant to 37 C.F.R. §1.28(b).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Printed Name of Inventor: Howard W. DeMoore

Date: May 1, 1990

Howard W. DeMoore
Signature of Inventor



Attorney Docket No.

B6012

SMALL ENTITY
INDEPENDENT INVENTOR

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

DECLARATION CLAIMING SMALL ENTITY STATUS
(37 C.F.R. §1.9(f) and §1.27 (b)) - INDEPENDENT INVENTOR

I, JOHN W. BIRD, hereby declare that I qualify as an independent inventor as defined in 37 C.F.R. §1.9(c) for the purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the U.S. Patent and Trademark Office with regard to the invention entitled

"RETRACTABLE INKING/COATING APPARATUS HAVING
FERRIS MOVEMENT BETWEEN PRINTING UNITS"

X in the application filed herewith.

_____ in U.S. application Serial No. _____ filed
_____.

_____ patent No. _____, issued _____.

I have not assigned, granted, conveyed or licensed, and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 C.F.R. §1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 C.F.R. §1.9(d) or a non-profit organization under 37 C.F.R. §1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under any obligation under contract or law to assign, grant, convey, or license any rights in the invention is identified below:

_____ no such person, concern or organization exists.

X any such person, concern or organization is identified below, if applicable:

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FOI 250 96457660

Full Name Howard W. DeMoore

Address 10954 Shady Trail

Dallas, Texas 75220

X individual small business concern

 nonprofit organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate pursuant to 37 C.F.R. §1.28(b).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Printed Name of Inventor: John W. Bird

Date: May 1, 1995 John W. Bird
Signature of Inventor

03345796-053101
FBI-250-967550

Attorney Docket No.

B6012

SMALL ENTITY
SMALL BUSINESS CONCERN

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL
ENTITY STATUS (37 C.F.R. §1.9(f) and §1.27(c))--
SMALL BUSINESS CONCERN

I, HOWARD W. DEMOORE

hereby declare that I am

— the owner of the small business concern identified below:

☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN Printing Research, Inc.

ADDRESS OF CONCERN 10954 Shady Trail

Dallas, Texas 75220

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 C.F.R. §121.3-18, and reproduced in 37 C.F.R. §1.9(d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when, either directly or indirectly, one concern controls or has the power to control the other, or a third-party or parties controls or has the power to control both.

I hereby declare that rights under license, contract or law have been acquired by or conveyed to and remain with the small business concern identified above with regard to the invention entitled

"RETRACTABLE INKING/COATING APPARATUS HAVING
FERRIS MOVEMENT BETWEEN PRINTING UNITS"

by inventors Ronald M. Rendleman, Howard W. DeMoore and
John W. Bird

as described in

☒ the specification filed herewith.
☐ the specification filed _____ under Serial
No. _____.
☐ Patent No. _____, issued _____.

If the rights held by the above-identified small business
concern are not exclusive, each individual, concern or organiza-
tion having rights to the invention is listed below and no rights
to the invention are held by any person, other than the inventor,
who could not qualify as a small business concern under 37 C.F.R.
§1.9(d) or by any concern which would not qualify as a small
business concern under 37 C.F.R. §1.9(d) or a nonprofit organiza-
tion under 37 C.F.R. §1.9(e).

☒ no such person, concern or organization exists
☐ any such person, concern or organization is iden-
tified below, if applicable:

Full Name _____

Address _____

☐ individual ☐ small business concern
☐ nonprofit organization

I acknowledge the duty to file, in this application or
patent, notification of any change in status resulting in loss
of entitlement to small entity status prior to paying, or at the
time of paying, the earliest of the issue fee or any maintenance
fee due after the date on which status as a small business entity
is no longer appropriate. (37 C.F.R. §1.28(b)).

I hereby declare that all statements made herein of my own
knowledge are true and that all statements made on information
and belief are believed to be true; and further that these
statements were made with the knowledge that willful false
statements and the like so made are punishable by fine or

imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

TYPED NAME OF PERSON SIGNING Howard W. DeMoore

TITLE OF PERSON OTHER THAN OWNER President and Chairman of
the Board

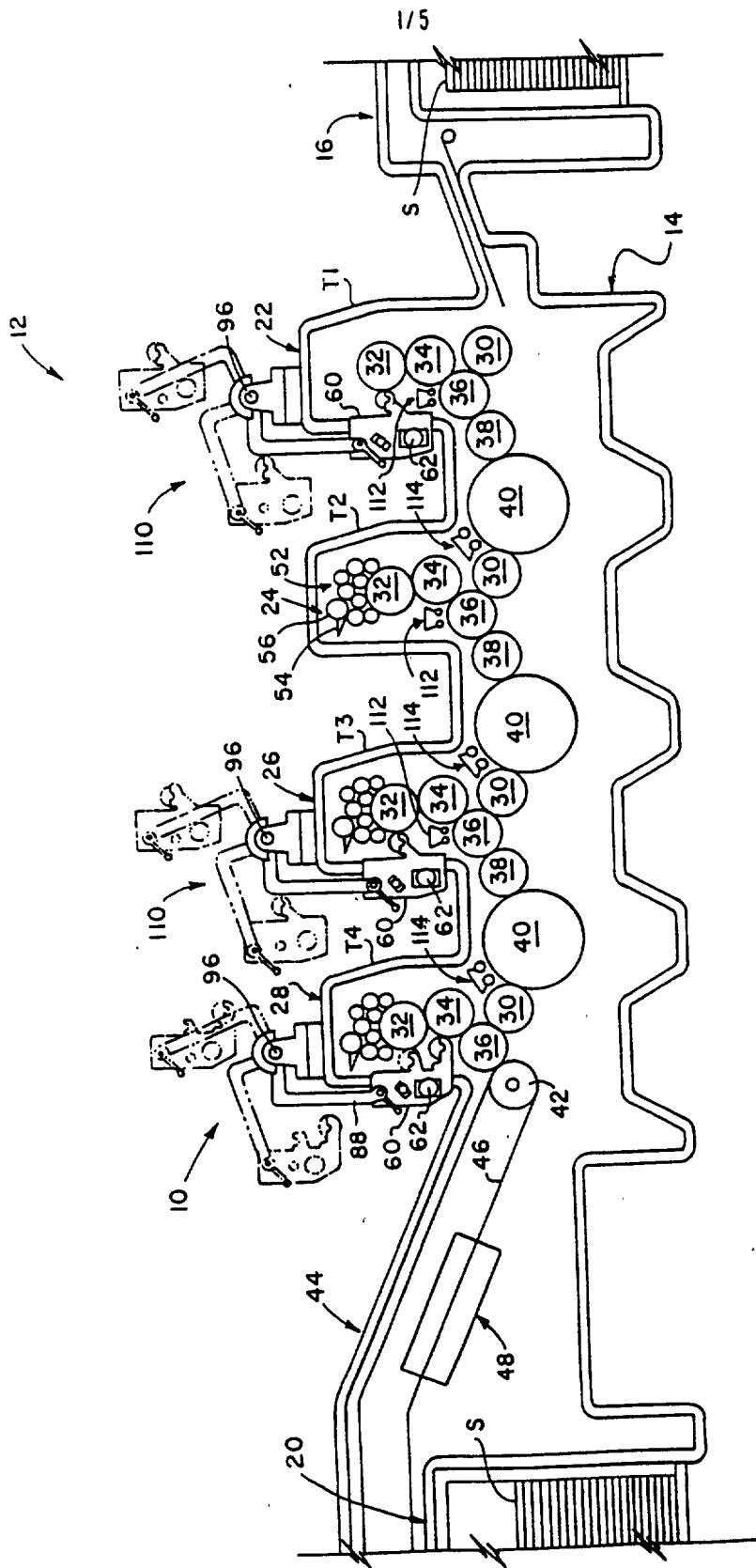
Date:

1 May 1975

Signature

Howard W. DeMoore

FORM 9-67





107250-9657560

W001405

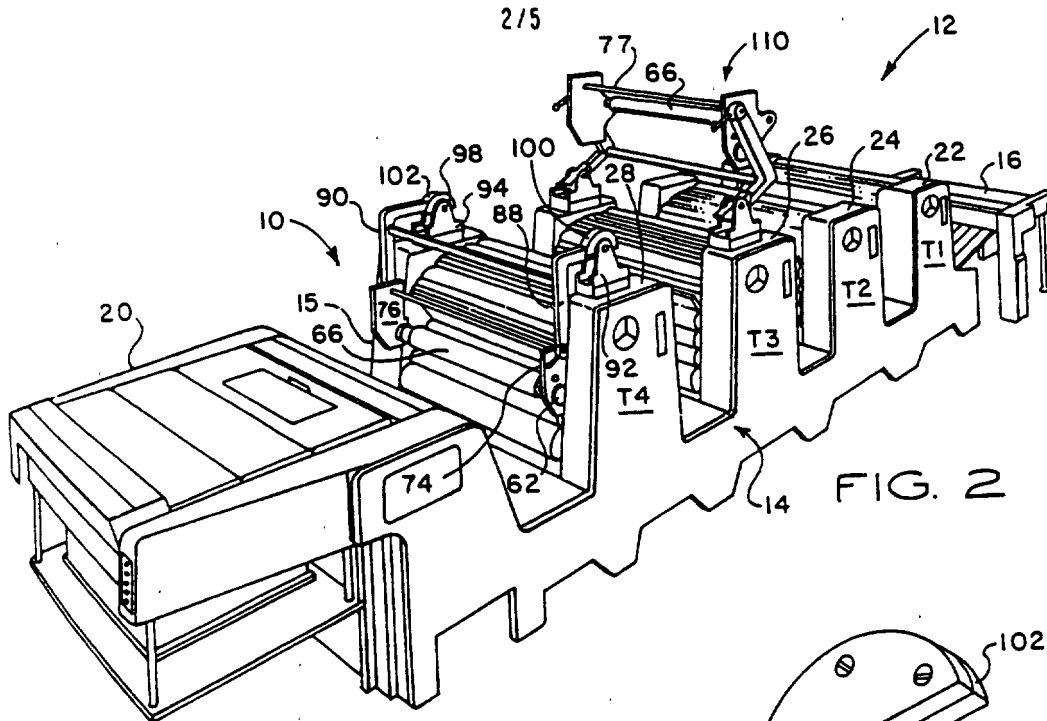


FIG. 2

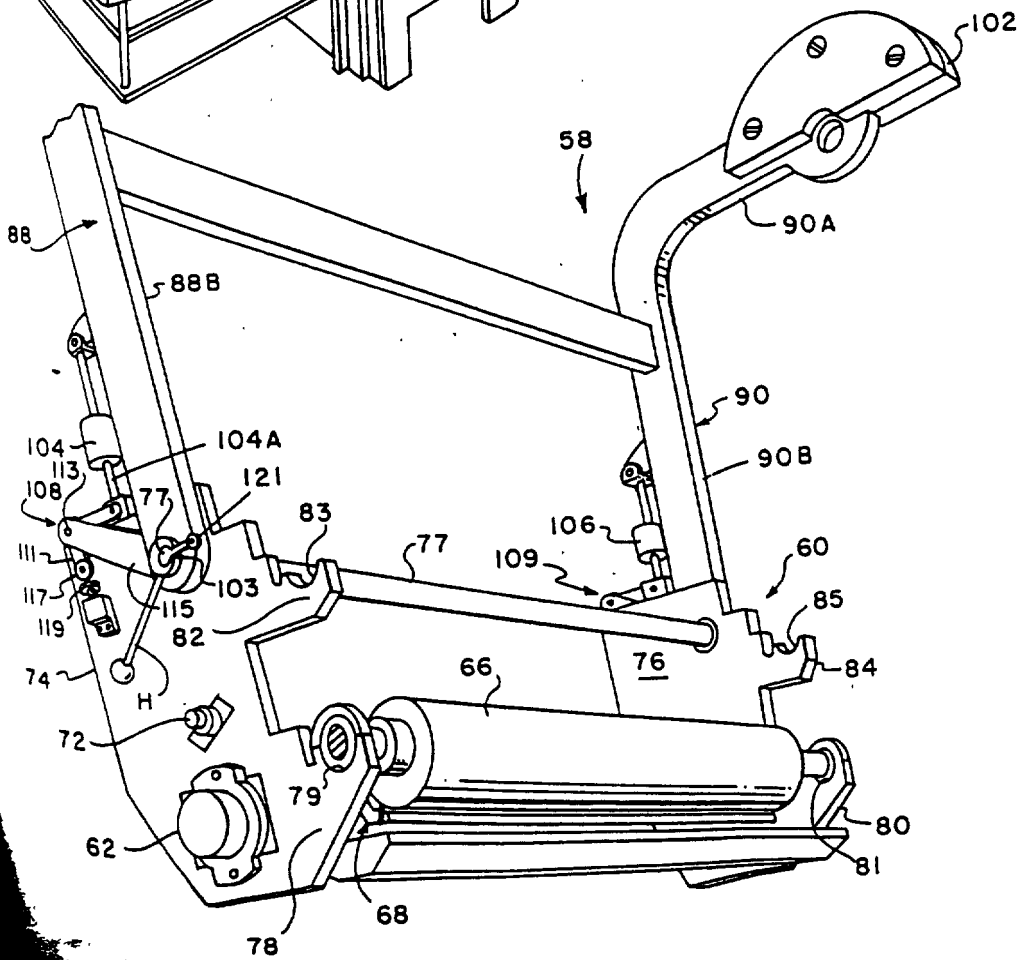


FIG. 3

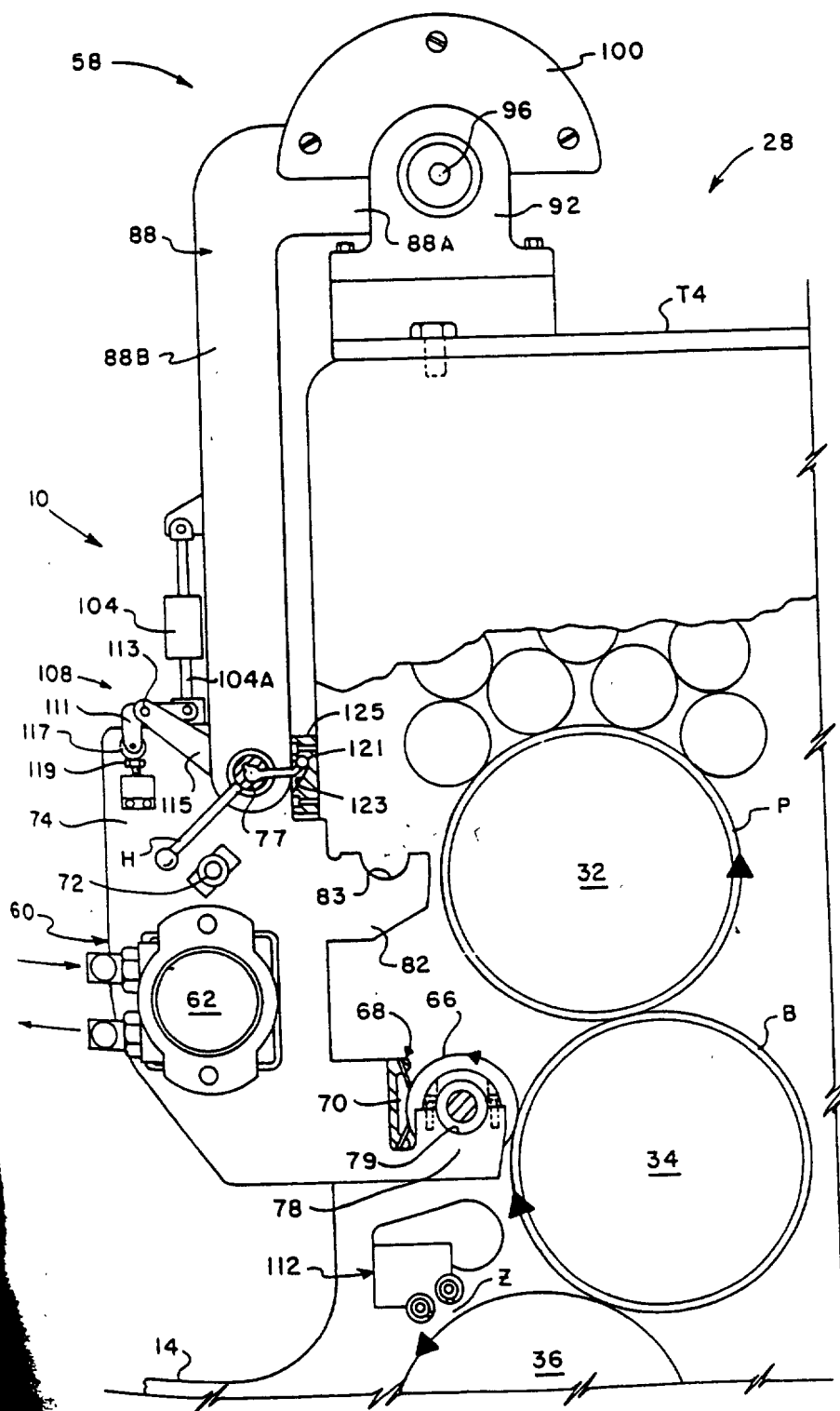


09415706.050101

W001407

08 435798

3/5



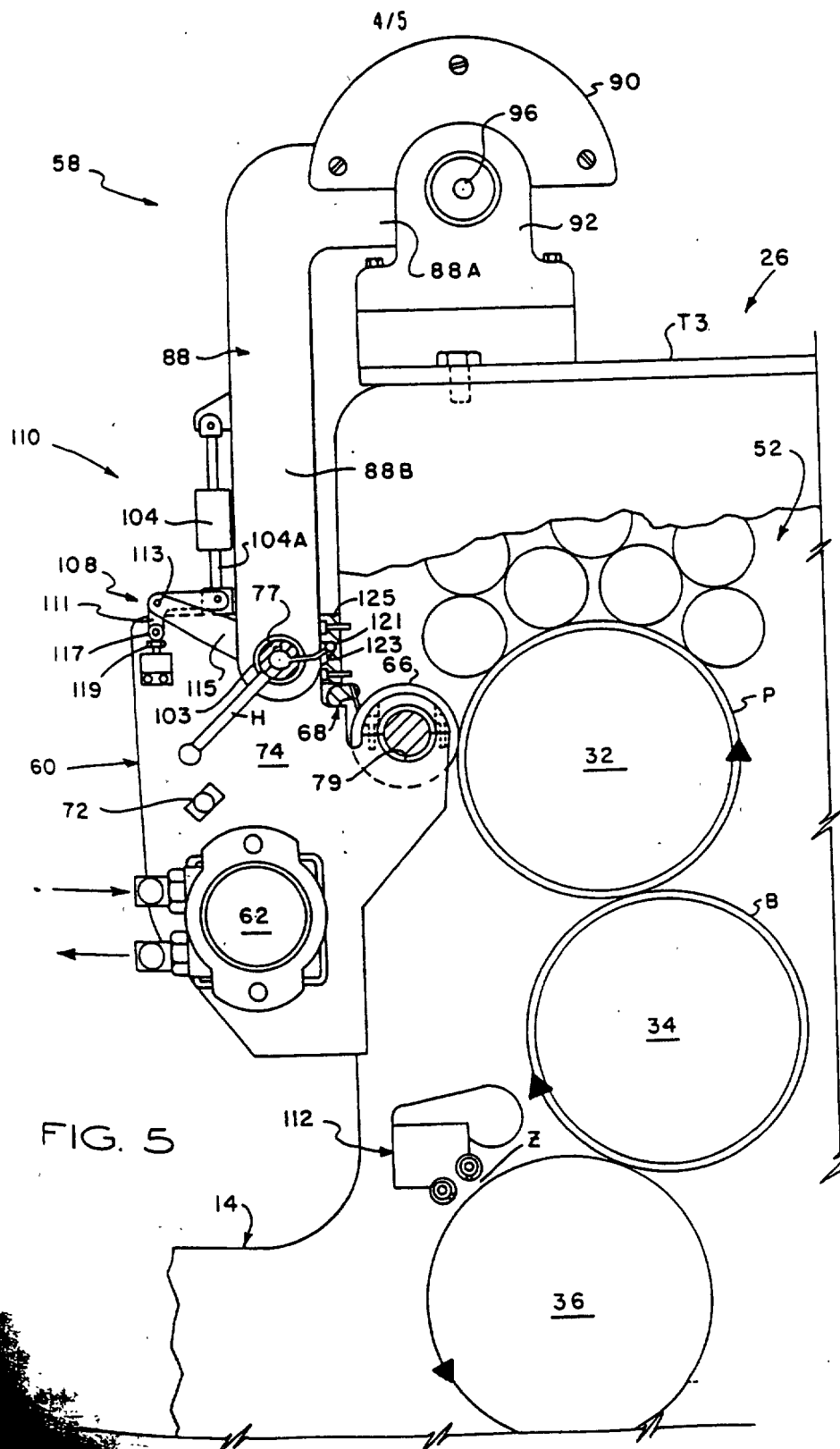
W001408



001409 20257760

W001409

08 435798



W001410



TO: 964 STEED

W001411

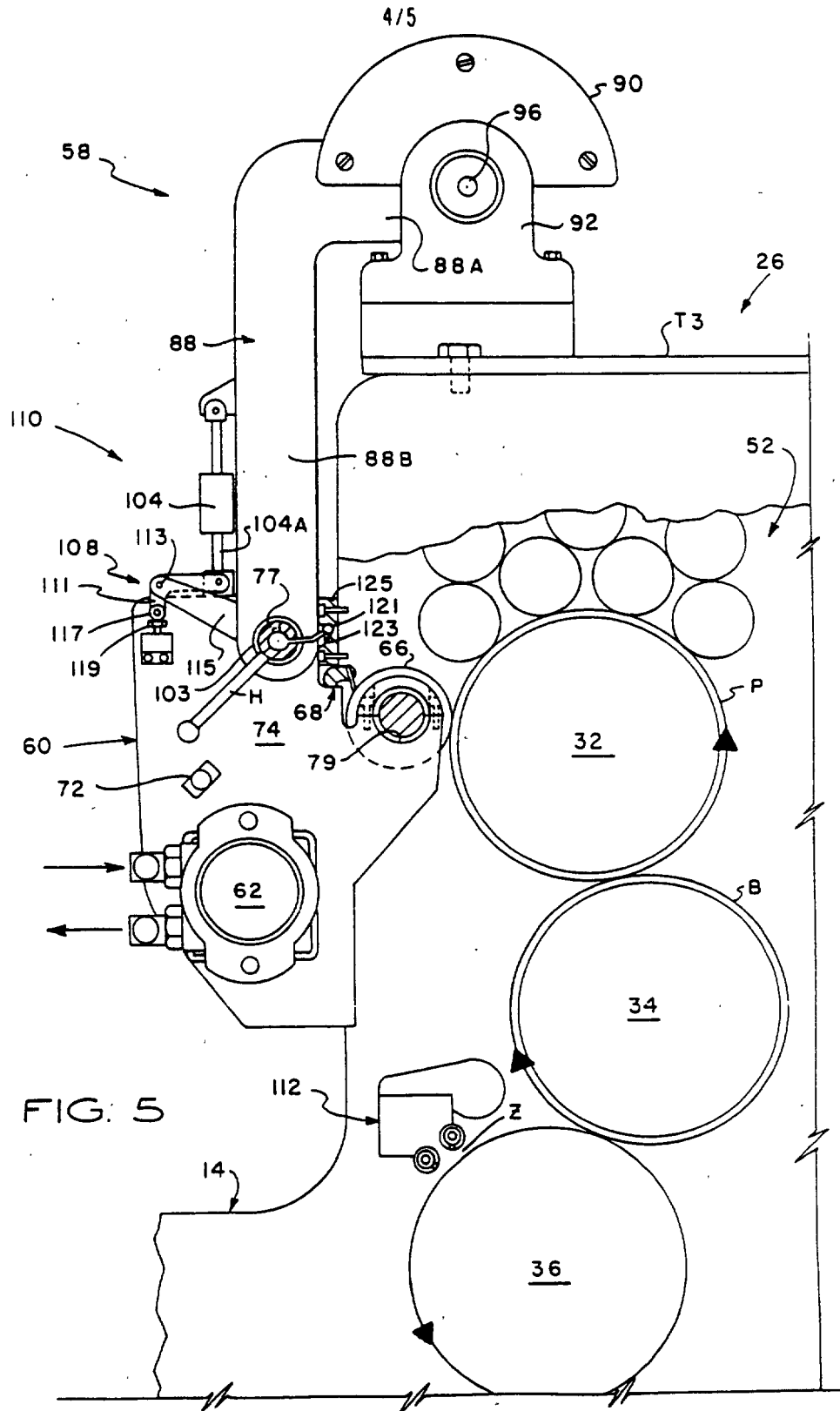


FIG. 5



TOT 250 430 457 67

SER

THE NEW YORK PUBLIC LIBRARY

10



Find the Weather for any City, State or Zipcode, or
Country

Language

English

Fast Forecast

Print This
Page

New!

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SATELLITE!**

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Add a Scrolling
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Temperature
Radar Map
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Wind

HEY YOU!

Metric | English | Both

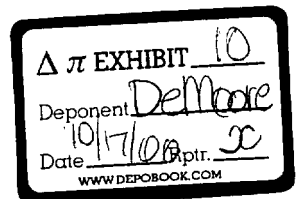
History for Dallas/Ft Worth, Texas

Observed: July 7, 1994	
Mean Temperature	86.9° F
Max Temperature	99.0° F
Min Temperature	72.0° F
Cooling Degree Days	20
Growing Degree Days	25 (base 60°F)
Dewpoint	72.6° F
Precipitation	0.0 in
Snow Depth	N/A
Sea Level Pressure	29.76 in
Standard Pressure	29.16 in
Visibility	14.70 mi
Wind Speed	15.42 mph
Max Wind Speed	21.64 mph
Gust Speed	26.35 mph
Events	

Previous Day or Next Day

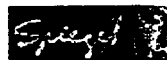
Historical Conditions

July 7 1994



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PRI 01063



Oct 09 00 11:34a

John Bird

203 544 0202

P. 2

CLT 5.2030 6:24AM FAX/VENTAL & FISH 214 969-5941

NO.273 P.1 7

PATENT
Our File: WILL 2501

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Reissue Application of
BILL L. DAVIS and JESSE S. WILLIAMSON
For Reissue of U. S. Patent 5,630,363
Issued May 20, 1997
Serial No 08/515,097
Filing Date: May 20, 1999
Serial No: 09/315,796 (Reissue)
For: COMBINED LITHOGRAPHIC/
FLEXOGRAPHIC PRINTING
APPARATUS AND PROCESS

§
§
§
§ Group Art Unit: 2854
§
§
§
§ Examiner: S. Funk
§ J. Hiten
§
§
§
§
§
§

SECOND SUPPLEMENTAL DECLARATION OF JOHN W. BIRD

TO: The Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

SIR:

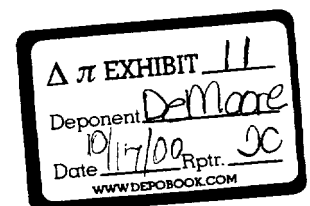
I, John W. Bird, declare on my oath the following:

1 I am the same John W. Bird who executed Declarations on December 1, 1999 and April 3, 2000 in the captioned application prosecution and wish to reaffirm the statements made therein, as clarified in my deposition on September 12, 2000, and with the further clarification given below

2 I have been presented with travel receipts of a trip by Jesse Williamson and Bill Davis to the Atlanta area bearing production numbers (W002705-2706), Exhibit "A" hereto I note the indication on the restaurant receipt of the name Morton's Buckhead and the date of June 12, 1994, which are consistent with my recollection that Steve Baker, a salesman with PRI, met with Jesse Williamson and Bill Davis in the Atlanta area in mid-1994 to pursue WPC's desire to purchase drier equipment. Steve had pre-trip plans, which he executed on the trip, to show Jesse and Bill a PRI-constructed HV interstation dryer at a James River carton printing plant in Newnan, Georgia. The Baker trip was a high profile venture inside PRI at the time in view of the possibilities of large sales of dryer equipment to Williamson, as Williamson had intended to replace many of their presses with new presses

SECOND SUPPLEMENTAL DECLARATION OF JOHN W. BIRD

Page 1



Oct 09 00 11:34a

John Bird

203 544 0202

P. 3

OCT 5 2000 6:24AM FALK, VESTAL & FISH 214-969-5941

NO. 273 P. 2-7

3 I note from a calendar, Exhibit "B", that June 12, 1994 was a Sunday

4 The restaurant receipt and the calendar further refresh my recollection of the circumstances, including the date and place of the Atlanta meeting, that I testified about in paragraph 10 of my original declaration signed June 11, 1999. I recall Baker coming into my office upon his return to Dallas several days after the Sunday meeting, in which the disclosure made to him by Jesse and Bill was passed on to me, the substance of which is discussed in paragraph 10 of my original declaration. Baker, I recall, returned on the following Wednesday the 15th, possibly Tuesday the 14th. Baker came into my office - I recall it was in the morning - the day following his return, and was quite enthusiastic about an additional sales opportunity PRI had - interstation retractable coater equipment with an anilox roller in accordance with Davis-Williamson's suggestions

5 I recall telling Howard DeMoore about the successful Baker trip and the disclosure by Davis and Williamson to Baker of an "up front" retractable coater with an anilox roller immediately after the conversation with Baker. It is incomprehensible to me as PRI's Product Manager at that time that telling DeMoore - Chief Executive and owner of PRI - would not have occurred the very same day I was told by Baker of the Davis-Williamson concept of going "up front" with a flexographic station, and that one of the alternatives indicated by Davis-Williamson to Baker was performing their contemplated process with a modified "rack-back" having an anilox roller and chambered doctor. I recall a discussion with DeMoore about this in my office. Looking at the 1994 calendar, that would have occurred, to the best of my recollection, ~~either the morning of June 15th or June 16th~~ on June 15th.

The undersigned Declarant stated further that all statements made herein of Declarant's own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.


John W. Bird

Date:

October 5, 2000

6-12-94 → 6-18-94

MARRIOTT INTERSTATE N HTL
ATLANTA GA

00108262

5/28	6/08	SS6WY4K3	GOLDEN CORRAL
6/05	6/08	10Z8L185	CALL HOME AMERICA
6/07	6/12	N3CZ2BPQ	15 INWOOD

ATHENS TX
BINGHAM FARMS MI
STONE MOUNTAIN GA
DALLAS TX
DALLAS TX

MARRIOTT INTERSTATE N HTL
ATLANTA GA

00108265

BUDGET RENT A CAR
EAST POINT GA

Reference
Number

0460099Z

Charges and
Other Debits

Payments
and Credits

00108265

ITEM 013
MORTONS/BUCKHEAD ATLANTA GA

Cardmaster Account No	Date of Charge 06/12/94	Reference Code 000094924	Approval Code 21
Service Establishment and Location MORTONS/BUCKHEAD ATLANTA GA			
Record of Charge			
FOOD AND BEVERAGE TIP			
S/P #			
TOTAL CHARGE AMOUNT			

6/12

CONTINUED FROM PREVIOUS PAGE

06-11-94 AMERICAN AIRLINES 16200104
DAL/FT WRTH TX
DALLAS/FT. WORTH TO ATLANTA
TICKET #0012179123187

06-11-94 AMERICAN AIRLINES 16200104
ATLANTA GA
ATLANTA TO DALLAS/FT. WORTH
TICKET #0012179123190

06-11-94 AMERICAN AIRLINES 16200104
ATLANTA GA
ATLANTA TO DALLAS/FT. WORTH
TICKET #0012179123191

06-14-94 MARRIOTT INTERSTATE N HTL 00108262
ATLANTA GA

06-14-94 MARRIOTT INTERSTATE N HTL 00108265
ATLANTA GA

TOTAL FOR CARD: 3855 530862 0037

Previous Balance	- Payments	- Credits	= Past Due Balance
Late Fees	+ New Charges	+ Other Debits	= Diners Club Balance Due

TO BE PAID
ATLANTA 1/90

BILL D.
1/90

TOTAL 174.07

CUSTOMER COPY

ESTABLISHMENT NAME

MORTON'S
ATLANTA, GA
410108781500000 01

DATE

JUN 12, 94

APPROVAL CODE

27

CUSTOMER NAME

JS WILLIAMSON
371381322136008
AMEX

96/11

TRANSACTION TYPE

SALE COMP.

0002

RECORD OF CHARGE

094924

TERMINAL

50012694

DESCRIPTION OF PURCHASES/SERVICES

FOOD AND BEVERAGE

BASE AMOUNT \$154.07

TIP AMOUNT

25.00

TOTAL

174.07

CUSTOMER SIGN HERE

X

Cardholder acknowledges receipt of goods and/or services in the amount of the total shown hereon and agrees to perform the obligations set forth in the Cardholder's agreement with the issuer.

		1	2	3	4
					5
6	7	8	9	10	11
					12
13	14	15	16	17	18
					19
20	21	22	23	24	25
					26
27	28	29	30		

6 months left

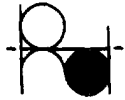
July 1994

				1	2
					3
4	5	6	7	8	9
					10
11	12	13	14	15	16
					17
18	19	20	21	22	23
					24
25	26	27	28	29	30
					31

Month 7

5 months left

TO BE SEEN



Printing Research, Inc.
"Mark-less" Super Blue®

Δ π EXHIBIT 12	
Deponent	DeMoore
Date	10/17/00
Rptr.	SC
WWW.DEPOBOOK.COM	

CLIENT CONFIDENTIALLY AGREEMENT

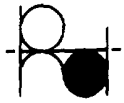
PRINTING RESEARCH, INC., of Dallas, Texas (hereafter "PRI"), desires to engage
in discussions with Williamson Printing of Dallas, Texas,
(name of company) (City and State)

(hereafter "CLIENT"), in connection with the manufacture and /or supply of certain goods and/or services by PRI. In connection with that engagement, it will be necessary for PRI to disclose to CLIENT certain confidential and proprietary information relating to the business and products of PRI, which information is not generally known or available to others. Accordingly, PRI wishes it to be expressly understood that all confidential and proprietary information which it discloses to CLIENT will be held in confidence and will not be disclosed to anyone nor used for any purpose outside the scope of the purpose of this engagement.

To this end, CLIENT expressly agrees that all confidential and proprietary information received by it from PRI will be maintained in confidence, and will be neither disclosed to anyone outside CLIENT'S organization, nor used for any purpose, in whole or in part, without the prior written consent of PRI. This obligation does not, of course, apply to any information possessed by CLIENT prior to the disclosure by PRI, or to information which may be received by CLIENT from PRI which, at the time of disclosure, is within the public domain or thereafter becomes publicly available through no fault of CLIENT.

CONFIDENTIAL

PRI 00252



Printing Research, Inc.
"Mark-less" Super Blue®

CLIENT CONFIDENTIALITY AGREEMENT

Page 2

Dated: 12/22/98

for PRI:

By: [Signature]

Title: Chairman

AGREED AND ACCEPTED BY CLIENT:

Dated: 12/21/98

By: [Signature]

Title: President

CONFIDENTIAL

PRI 00253



Printing Research, Inc.
"Mark-less" Super Blue®

CLIENT CONFIDENTIALLY AGREEMENT

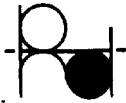
PRINTING RESEARCH, INC., of Dallas, Texas (hereafter "PRI"), desires to engage
in discussions with Williamson Printing of Dallas, Texas,
(name of company) (City and State)

(hereafter "CLIENT"), in connection with the manufacture and /or supply of certain goods and/or services by PRI. In connection with that engagement, it will be necessary for PRI to disclose to CLIENT certain confidential and proprietary information relating to the business and products of PRI, which information is not generally known or available to others. Accordingly, PRI wishes it to be expressly understood that all confidential and proprietary information which it discloses to CLIENT will be held in confidence and will not be disclosed to anyone nor used for any purpose outside the scope of the purpose of this engagement.

To this end, CLIENT expressly agrees that all confidential and proprietary information received by it from PRI will be maintained in confidence, and will be neither disclosed to anyone outside CLIENT'S organization, nor used for any purpose, in whole or in part, without the prior written consent of PRI. This obligation does not, of course, apply to any information possessed by CLIENT prior to the disclosure by PRI, or to information which may be received by CLIENT from PRI which, at the time of disclosure, is within the public domain or thereafter becomes publicly available through no fault of CLIENT.

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PRI 00254



Printing Research, Inc.
"Mark-less" Super Blue®

CLIENT CONFIDENTIALITY AGREEMENT

Page 2

Dated: 12/22/98

for PRI:

By: [Signature]

Title: Chairman

AGREED AND ACCEPTED BY CLIENT:

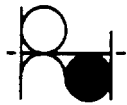
Dated: 12/21/98

By: [Signature]

Title: President

CONFIDENTIAL

PRI 00255



Printing Research, Inc.
"Mark-less" Super Blue®

December 18, 1998

VIA CERTIFIED MAIL, RETURN RECEIPT REQUESTED
NO.: Z 154 108 343

Mr. Jesse Williamson
Williamson Printing Corp
6700 Denton Dr
Dallas TX 75235

Dear Jesse,

It was a pleasure to meet with Bill Davis, Paul Yarvis and you on November 9 in our facility to show you our new impression cylinder coating concept. We are excited by this new development and look forward to finalizing our development work and making this improvement available for testing.

As I have been out of town for 3½ weeks, Mr. Steve Garner has informed me that you have not returned the Non-Disclosure Agreement. Therefore, I have enclosed another copy of the Non-Disclosure Agreement and would appreciate you signing and returning it to me as soon as possible.

Naturally you understood and agreed that our meeting was held in confidence because the new impression cylinder coating concept has not been exposed to the public. We expect and trust that you will not use or disclose the confidential information we shared with you without our permission.

Thank you for your interest in this new development from PRI.

Sincerely yours,

Howard DeMoore
Chairman

HD:ln

Enclosure

cc: Bill Davis
Paul Yarvis

CONFIDENTIAL

PRI 00256

UNITED STATES POSTAL SERVICE
OFFICIAL BUSINESS



PENALTY FOR PRIVATE
USE, \$300

SENDER INSTRUCTIONS

- Print your name, address, and ZIP Code in the space below.
- Complete items 1, 2, 3, and 4 on the reverse.
 - Attach to front of article if space permits, otherwise affix to back of article.
 - Enclose article "Return Receipt Requested"
 - adjacent to number.

RETURN
TO



PRINTING RESEARCH INC
Dallas, Texas

Howard DeMoore
PRINTING RESEARCH INC
(Name of Sender)

DEC 22 1998

10954 SHADY TRAIL
(Street or P.O. Box)

RECEIVED

DALLAS TX 75220
(City, State, and ZIP Code)

03416396 0584404

PS Form 3811, July 1982

RETURN RECEIPT

<p>• SENDER: Complete items 1, 2, 3, and 4. Add your address in the "RETURN TO" space on reverse.</p> <p>(CONSULT POSTMASTER FOR FEES)</p> <p>1. The following services are requested (check one):</p> <p><input checked="" type="checkbox"/> Show to whom and date delivered</p> <p><input type="checkbox"/> Show to whom, date, and address of delivery</p> <p>2. <input type="checkbox"/> RESTRICTED DELIVERY (The restricted delivery fee is charged in addition to the return receipt fee.)</p> <p>TOTAL \$</p>		<p>3. ARTICLE ADDRESSED TO:</p> <p>PAUL YAEVIS Williamson PETS COOP 6100 DEUTERON DR DALLAS TX 75235</p> <p>4. TYPE OF SERVICE</p> <p><input checked="" type="checkbox"/> REGISTERED <input type="checkbox"/> INSURED <input type="checkbox"/> COD</p> <p><input type="checkbox"/> CERTIFIED <input type="checkbox"/> EXPRESS MAIL</p> <p>ARTICLE NUMBER 2154108345</p>	
<p>5. DATE OF DELIVERY DEC 21 1998</p> <p>6. ADDRESSEE'S ADDRESS (only if requested)</p>		<p>7a. EMPLOYEE'S INITIALS</p>	
<p>7. UNABLE TO DELIVER BECAUSE:</p>		<p>7b. EMPLOYEE'S INITIALS</p>	

POSTMARK (may be on reverse side)

1. I have received the article described above.

SIGNATURE ☐ Addressee ☐ Authorized agent

(Always obtain signature of addressee or agent)

* GPO: 1983-379-603

CONFIDENTIAL

PRI 00249

UNITED STATES POSTAL SERVICE
OFFICIAL BUSINESS



PENALTY FOR PRIVATE
USE, \$300

SENDER INSTRUCTIONS

Print your name, address, and ZIP Code in the space below.

- Complete items 1, 2, 3, and 4 on the reverse.
- Attach to front of article if space permits, otherwise affix to back of article.
- Endorse article "Return Receipt Requested"
- adjacent to number.

RETURN
TO



HOWARD DeMOORE
PRINTING RESEARCH INC.
(Name of Sender)

DEC 22 1998

10954 SHADY TRAIL
(Street or P.O. Box)

RECEIVED

DALLAS TX 75220
(City, State, and ZIP Code)

CONFIDENTIAL

<p>• SENDER: Complete items 1, 2, 3, and 4. Add your address in the "RETURN TO" space on reverse.</p> <p>(CONSULT POSTMASTER FOR FEES)</p> <p>1. The following service is requested (check one). <input checked="" type="checkbox"/> Show to whom and date delivered <input type="checkbox"/> Show to whom, date, and address of delivery</p> <p>2. <input type="checkbox"/> RESTRICTED DELIVERY (The restricted delivery fee is charged in addition to the return receipt fee.)</p>		<p>3. ARTICLE ADDRESSED TO: JESSE Williamson Williamson PETE Corp 6200 DENVER DR DALLAS TX 75220</p> <p>4. TYPE OF SERVICE <input type="checkbox"/> REGISTERED <input type="checkbox"/> INSURED <input checked="" type="checkbox"/> CERTIFIED <input type="checkbox"/> COO <input type="checkbox"/> EXPRESS MAIL</p> <p>ARTICLE NUMBER Z154108343</p>		<p>5. I have received the article described above. SIGNATURE: [Signature] AUTHORIZED SIGNATURE</p> <p>6. ADDRESSSEE'S ADDRESS (only if requested) DEC 21 1998</p>		<p>7a. EMPLOYEE'S INITIALS</p>	
<p>7. UNABLE TO DELIVER BECAUSE:</p>		<p>TOTAL \$</p>		<p>POSTMARK (only for an insured item)</p>			

PS Form 3811, July 1982

RETURN RECEIPT

CONFIDENTIAL

PRI 00250

RETURN RECEIPT

● SENDER: Complete items 1, 2, 3, and 4. Add your address in the "RETURN TO" space on reverse.	
(CONSULT POSTMASTER FOR FEES)	
1. The following service is requested (check one): <input checked="" type="checkbox"/> Show to whom and date delivered <input type="checkbox"/> Show to whom, date, and address of delivery <input type="checkbox"/> RESTRICTED DELIVERY (The restricted delivery fee is charged in addition to the return receipt fee.)	
TOTAL \$	
3. ARTICLE ADDRESSED TO: BILL DAVIS WILLIAMSON PRINTING CORP 6300 DENTON DR DALLAS TX 75220	
4. TYPE OF SERVICE: <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED <input type="checkbox"/> COD <input type="checkbox"/> EXPRESS MAIL	ARTICLE NUMBER 2154 108 344
(Always obtain signature of addressee or agent)	
5. I have received the article described above. SIGNATURE <i>[Signature]</i> Addressee <input type="checkbox"/> Authorized agent <input type="checkbox"/>	
DATE OF DELIVERY DEC 21 1993	
POSTMARK (may be on reverse side)	
6. ADDRESSEE'S ADDRESS (only if requested)	
7. UNABLE TO DELIVER BECAUSE:	
7a. EMPLOYEE'S INITIALS	

* GPO: 1982-378-563

 UNITED STATES POSTAL SERVICE
 OFFICIAL BUSINESS

SENDER INSTRUCTIONS

- Print your name, address, and ZIP Code in the space below.
- Complete items 1, 2, 3, and 4 on the reverse.
 - Attach to front of article if space permits, otherwise affix to back of article.
 - Endorse article "Return Receipt Requested" adjacent to number.



PENALTY FOR PRIVATE USE, \$300

 RETURN TO
 PRINTING RESEARCH INC

DEC 22 1993

RECEIVED

 HOWARD DEMOORE
 PRINTING RESEARCH INC
 (Name of Sender)

 10954 SHADY TRAIL
 (Street or P.O. Box)

 DALLAS TX 75220
 (City, State, and ZIP Code)


.

CONFIDENTIAL

PRI 00251

Printing Research, Inc.
"Mark-less" Super Blue®

CERTIFIED

Z 154 108 343

MAIL



Mr. Jesse Williamson
Williamson Printing Corp
6700 Denton Dr
Dallas TX 75235

CONFIDENTIAL

PRI 00246

Printing Research, Inc.
"Mark-less" Super Blue®

CERTIFIED

Z 154 108 344

MAIL



Mr. Bill Davis
Williamson Printing Corp
6700 Denton Dr
Dallas TX 75235

CONFIDENTIAL

PRI 00247



Printing Research, Inc.

"Mark-less" Super Blue

CERTIFIED

02 FEB 90

Z 154 106 345

MAIL



Mr. Paul Yarvis
Williamson Printing Corp
6700 Denton Dr
Dallas TX 75235

CONFIDENTIAL

PRI 00248



WILLIAMSON PRINTING CORPORATION

6700 Denton Drive Dallas, Texas 75235 4497 214 904 2100 Fax 214 352 1842 WATS 800 843 5423

December 21, 1998

Mr. Howard DeMoore
Printing Research, Inc.
10954 Shady Trail
Dallas, Texas 75220

Dear Howard:

I received your letter this morning ,via certified mail, regarding our signing a confidentiality agreement.

I must say it irritates me that you sent a certified letter instead of just calling me up and asking for it. Does this mean we're starting off on the wrong foot?

As you and Steve are aware, PRI and WPC already have a non-disclosure agreement in effect. It is one that we asked you to sign, and it is bilateral.

I have signed your agreement as you requested (see enclosed). I would appreciate you sending me a copy of it for my records after you have signed and initiated it.

Howard, I am puzzled about how you chose to communicate with us regarding this matter. Is there a particular reason you sent this letter certified?

I look forward to receiving my copy of this signed agreement and hearing back from you on the above.

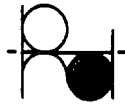
Sincerely,


Jesse Williamson
President

P.S. Have a happy and safe holiday.

CONFIDENTIAL

PRI 00242



Printing Research, Inc.

"Mark-less" Super Blue®

December 18, 1998

VIA CERTIFIED MAIL, RETURN RECEIPT REQUESTED

NO.: Z 154 108 343

Mr. Jesse Williamson
Williamson Printing Corp
6700 Denton Dr
Dallas TX 75235

Dear Jesse.

It was a pleasure to meet with Bill Davis, Paul Yarvis and you on November 9 in our facility to show you our new impression cylinder coating concept. We are excited by this new development and look forward to finalizing our development work and making this improvement available for testing.

As I have been out of town for 3½ weeks, Mr. Steve Garner has informed me that you have not returned the Non-Disclosure Agreement. Therefore, I have enclosed another copy of the Non-Disclosure Agreement and would appreciate you signing and returning it to me as soon as possible.

Naturally you understood and agreed that our meeting was held in confidence because the new impression cylinder coating concept has not been exposed to the public. We expect and trust that you will not use or disclose the confidential information we shared with you without our permission.

Thank you for your interest in this new development from PRI.

Sincerely yours,

Howard DeMoore
Chairman

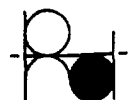
HD:ln

Enclosure

cc: Bill Davis
Paul Yarvis

CONFIDENTIAL

PRI 00243



Printing Research, Inc.

"Mark-less" Super Blue®

CLIENT CONFIDENTIALLY AGREEMENT

PRINTING RESEARCH, INC., of Dallas, Texas (hereafter "PRI"), desires to engage
in discussions with Williamson Printing of Dallas, Texas,
(name of company) (City and State)

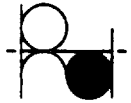
(hereafter "CLIENT"), in connection with the manufacture and /or supply of certain goods and/or services by PRI. In connection with that engagement, it will be necessary for PRI to disclose to CLIENT certain confidential and proprietary information relating to the business and products of PRI, which information is not generally known or available to others. Accordingly, PRI wishes it to be expressly understood that all confidential and proprietary information which it discloses to CLIENT will be held in confidence and will not be disclosed to anyone nor used for any purpose outside the scope of the purpose of this engagement.

To this end, CLIENT expressly agrees that all confidential and proprietary information received by it from PRI will be maintained in confidence, and will be neither disclosed to anyone outside CLIENT'S organization, nor used for any purpose, in whole or in part, without the prior written consent of PRI. This obligation does not, of course, apply to any information possessed by CLIENT prior to the disclosure by PRI, or to information which may be received by CLIENT from PRI which, at the time of disclosure, is within the public domain or thereafter becomes publicly available through no fault of CLIENT.

CONFIDENTIAL

PRI 00244

10954 Shady Trail Dallas, Texas 75220 U.S.A



Printing Research, Inc.
"Mark-less" Super Blue®

CLIENT CONFIDENTIALITY AGREEMENT

Page 2

for PRI:

Dated: _____

By: _____

Title: _____

AGREED AND ACCEPTED BY CLIENT:

Dated: 12/21/98

By: [Signature]

Title: President

CONFIDENTIAL

PRI 00245

[illegible]

DENNIS T. GRIGGS
ATTORNEY AT LAW

PRESTON ROAD AT LBJ FREEWAY
NORTH DALLAS BANK TOWER, SUITE 1202
12900 PRESTON ROAD, LB-38
DALLAS, TEXAS 75230

PATENT, TRADEMARK AND
COPYRIGHT MATTERS

(214) 458-8559
FAX (214) 458-2557

INTERNET
griggs@airmail.net

June 7, 1996

Printing Research, Inc.
Attn: Mr. Edwin M. Schaffler,
Exec. Vice President & CFO
10954 Shady Trail
Dallas, Texas 75220

Re: U.S. Patent Application
"Retractable Inking/Coating Apparatus Having Ferris
Movement Between Printing Units"
Inventors: Ronald M. Rendleman, Howard W. DeMoore
and John W. Bird
Assignee: Howard W. DeMoore
Our File: B6012

Dear Ed:

Enclosed is a copy of the following:

1. First Office Action (Paper No. 02); and,
2. Election of Inventions - Without Traverse

which has been filed in the U.S. Patent Office.

I will report again upon receipt of the next office
action.

With best regards.

Very truly yours,



Dennis T. Griggs

DTG/k1
Enclosures

Δ π EXHIBIT 13	
Deponent	DeMoore
Date	10/17/00 Rptr
WWW.DEPOBOOK.COM	

PRI 01703

DENNIS T. GRIGGS

ATTORNEY AT LAW

PRESTON ROAD AT LBJ FREEWAY
NORTH DALLAS BANK TOWER, SUITE 1202
12900 PRESTON ROAD, LB-38
DALLAS, TEXAS 75230

PATENT, TRADEMARK AND
COPYRIGHT MATTERS

(214) 458-8559
FAX (214) 458-2557

INTERNET
griggs@airmail.net

April 17, 1996

Printing Research, Inc.
Attn: Mr. Edwin M. Schaffler,
Exec. Vice President & CFO
10954 Shady Trail
Dallas, Texas 75220

Re: U.S. Patent Application
"Retractable Coater with Ferris Movement"
Inventors: Ronald M. Rendleman, Howard W. DeMoore
and John W. Bird
Assignee: Howard W. DeMoore
Our File: B6012

Dear Ed:

This will acknowledge receipt of the assignment to Howard W. DeMoore for the invention and patent application entitled "Retractable Inking/Coating Apparatus Having Ferris Movement Between Printing Units".

The assignment document has been forwarded to the Assignment Branch of the U.S. Patent and Trademark Office for recording. I will forward the recording certificate to you when it becomes available.

The purpose of recording the assignment is to provide constructive notice with respect to ownership by Howard W. DeMoore. 35 U.S.C. §261 provides as follows:

An assignment, grant or conveyance shall be void as against any subsequent purchaser or mortgagee for valuable consideration, without notice, unless it is recorded in the Patent and Trademark Office within three months from its date or prior to the date of such subsequent purchase or mortgage.

As a result of the recording of this assignment, the Commissioner of Patents and Trademarks will enter the name of

PRI 01704

Printing Research, Inc.
April 17, 1996
Page 2

Howard W. DeMoore as the owner in any and all Letters Patent which shall issue.

With best regards.

Very truly yours,



Dennis T. Griggs

DTG/kl

001596-0310
10F330-9645F60

DENNIS T. GRIGGS
ATTORNEY AT LAW

PRESTON ROAD AT LBJ FREEWAY
NORTH DALLAS BANK TOWER, SUITE 1202
12900 PRESTON ROAD, LB-38
DALLAS, TEXAS 75230

PATENT, TRADEMARK AND
COPYRIGHT MATTERS

(214) 458-8559
FAX (214) 458-2557

INTERNET
griggs@airmail.net

April 3, 1996

VIA FACSIMILE - CONFIRMATION BY FIRST CLASS

ACTION
REQUIRED

Printing Research, Inc.
Attn: Mr. Edwin M. Schaffler,
Exec. Vice President & CFO
10954 Shady Trail
Dallas, Texas 75220

Re: U.S. Patent Application
"Retractable Inking/Coating Apparatus Having Ferris
Movement Between Printing Units"
S/N: 08/438,798
Inventors: Howard W. DeMoore, Ronald M. Rendleman
and John W. Bird
Assignee: Howard W. DeMoore
Our File: B6012

Dear Ed:

This is a reminder about filing foreign patent applications on this invention.

If you contemplate a foreign program based on your U.S. patent pending filing date, a patent application in any foreign country including a European patent application must be on file before the expiration of the convention period ending May 4, 1996.

I will provide specific filing information, including cost estimates for particular countries of interest, upon request.

Very truly yours,



Dennis T. Griggs

DTG/k1

URGENT

PRI 01706

Memo to Dennis T. Griggs, Attorney:

Subject: Foreign Patent Filing

Invention: "Retractable Inking/Coating Apparatus Having Ferris
Movement Between Printing Units"

U.S. Serial No.: 08/435,798

Filed: May 4, 1995

From: Howard W. DeMoore/Printing Research, Inc.

*One year foreign filing deadline under the Paris Convention:
May 4, 1995

Send estimates on foreign patent application filing costs
for the following countries (circle):

Canada	Germany	European Group (EPC)
Mexico	France	International Group (PCT)
Great Britain	Japan	Korea
Australia	Taiwan	China

Others: _____

I do not wish to file foreign patent applications at this
time.

Date: _____
Signature

Please return this memo to:

Dennis T. Griggs
Attorney at Law
North Dallas Bank Tower, Suite 1202
12900 Preston Road, LB-38
Dallas, Texas 75230

*If more than one year has elapsed since your U.S. filing date, a
non-convention counterpart to your U.S. patent application may be
filed in most countries, provided that the invention has not yet
been advertised, published, sold or offered for sale.

PRI 01707

DENNIS T. GRIGGS

Attorney at Law

North Dallas Bank Tower, Suite 1202
12900 Preston Road, LB-38
Dallas, Texas 75230 USA

Internet:

griggs@airmail.net

(214) 458-8559

FAX (214) 458-2557

Date: April 3, 1996

FACSIMILE TRANSMITTAL SHEET

PLEASE DELIVER 7 PAGES (INCLUDING COVER SHEET) TO:

NAME: Mr. Edwin M. Schaffler

COMPANY: Printing Research, Inc.

FACSIMILE NO.: 357-5847

TELEPHONE NO.: 353-9000

RE: Foreign Filing

MESSAGE:

IF THERE ARE ANY PROBLEMS WITH THIS TRANSMISSION,
CALL KATHY LONGENECKER -- (214) 458-8559

CLIENT: Printing Research

FILE NO. B6012/B5922

CLIENT NO. 1975

 ORIGINAL WILL NOT FOLLOW X ORIGINAL WILL FOLLOW VIA:

 X FIRST CLASS
 AIR MAIL
 HAND DELIVERY
 LOCAL COURIER
 FEDERAL EXPRESS

PRI 01708

DENNIS T. GRIGGS

	DATE	TIME	TO/FROM	MODE	MIN/SEC	PGS	CMDH	STATUS
27	04/03	10:24	2143575847	EC--S	02'04"	007	125	OK

DENNIS T. GRIGGS

Attorney at Law

North Dallas Bank Tower, Suite 1202
12900 Preston Road, LB-38
Dallas, Texas 75230 USA

Internet:

griggs@airmail.net

(214) 458-8559

FAX (214) 458-2557

Date: April 3, 1996

FACSIMILE TRANSMITTAL SHEET

PLEASE DELIVER 7 PAGES (INCLUDING COVER SHEET) TO:

NAME: Mr. Edwin M. Schaffler

COMPANY: Printing Research, Inc.

FACSIMILE NO.: 357-5847

TELEPHONE NO.: 353-9000

RE: Foreign Filing

MESSAGE:

IF THERE ARE ANY PROBLEMS WITH THIS TRANSMISSION,
CALL KATHY LONGENECKER -- (214) 458-8559

CLIENT: Printing Research FILE NO. B6012/B5922

CLIENT NO. 1975

 ORIGINAL WILL NOT FOLLOW X ORIGINAL WILL FOLLOW VIA:

X FIRST CLASS
 AIR MAIL
 HAND DELIVERY
 LOCAL COURIER
 FEDERAL EXPRESS

AKIN, GUMP, STRAUSS, HAUER & FELD, L.L.P.

ATTORNEYS AT LAW

A REGISTERED LIMITED LIABILITY PARTNERSHIP
INCLUDING PROFESSIONAL CORPORATIONS

1700 PACIFIC AVENUE
SUITE 4100
DALLAS, TEXAS 75201-4618
(214) 969-2800
TELEX 732324
FAX (214) 969-4343

BRUSSELS, BELGIUM
MOSCOW, RUSSIA

WASHINGTON, D.C.
AUSTIN, TEXAS
SAN ANTONIO, TEXAS
HOUSTON, TEXAS
NEW YORK, NEW YORK

WRITER'S DIRECT DIAL NUMBER (214) 969-2747

June 8, 1995

Printing Research, Inc.

Attn: Mr. Edwin M. Schaffler,
Exec. Vice President & CFO
10954 Shady Trail
Dallas, Texas 75220

Re: U.S. Patent Application
"Retractable Inking/Coating Apparatus Having Ferris
Movement Between Printing Units"
S/N: 08/435,798
Our File: B6012

Dear Ed:

Enclosed is a copy of the official filing receipt as
issued by the U.S. Patent and Trademark Office for the above-
identified patent application.

This is the official notification that patent pending
status was obtained on May 4, 1995 under Patent Office Serial No.
08/435,798.

Additionally, a license authorizing the filing of
corresponding applications for Letters Patent in foreign countries
has been granted. Foreign applications filed within twelve months
of the filing date of the U.S. application receive priority
benefits of the U.S. filing date.

The notation "Patent Pending" or "Patent Applied For" may
now be used in connection with any advertising or business litera-
ture for products covered by the claims of the application. I
recommend that a patent pending notice be applied directly to any
such products which are sold or offered for sale.

This patent application will be maintained in secrecy by
the Patent Office, and consequently, will not be available to the
general public. You may choose to maintain such secrecy, but you
are not required to do so.

I recommend that you keep the serial number and filing

PRI 01710

AKIN, GUMP, STRAUSS, HAUER & FELD, L.L.P.

June 8, 1995

Page 2

date confidential. Legal protection arises only when a patent issues. The existence of a patent application may have a deterrent effect upon potential infringers. By keeping the filing date and serial number secret, competitors cannot determine when your application was filed and therefore will not be able to estimate when a patent might issue.

I expect an examination of this application by the U.S. Patent and Trademark Office about twelve to fifteen months after the filing date.

I will keep a close watch on your application and report developments to you. Please let me know of any modifications or improvements to your commercial design.

Additionally, any change of address or ownership of patent rights should be reported to me immediately.

Very truly yours,



Dennis T. Griggs

DTG/k1
Enclosure

PRI 01711

AKIN, GUMP, STRAUSS, HAUER & FELD, L.L.P.

ATTORNEYS AT LAW

WASHINGTON, D.C.
AUSTIN, TEXAS
SAN ANTONIO, TEXAS
HOUSTON, TEXAS
NEW YORK, NEW YORK

A REGISTERED LIMITED LIABILITY PARTNERSHIP
INCLUDING PROFESSIONAL CORPORATIONS

BRUSSELS, BELGIUM
MOSCOW, RUSSIA

1700 PACIFIC AVENUE
SUITE 4100
DALLAS, TEXAS 75201-4618
(214) 969-2800
TELEX 732324
FAX (214) 969-4343

WRITER'S DIRECT DIAL NUMBER (214) 969-2747

May 22, 1995

Printing Research, Inc.
Attn: Mr. Edwin M. Schaffler,
Exec. Vice President & CFO
10954 Shady Trail
Dallas, Texas 75220

Re: U.S. Patent Application
"Retractable Inking/Coating Apparatus Having Ferris Movement Between
Printing Units"
Our File: B6012

Dear Ed:

An application for grant of U.S. Letters Patent on this invention was filed in the
U.S. Patent and Trademark Office on

May 4, 1995

under Serial No.

08/435,798.

A copy of the postcard confirmation is enclosed for your records.

The postcard notice indicates that this patent application was safely received. We
expect to receive the official government filing receipt within two to three months, and will
forward a copy of it to you at that time.

Very truly yours,


Dennis T. Griggs

DTG/kl
Enclosure

PRI 01712

AKIN, GUMP, STRAUSS, HAUER & FELD, L.L.P.

ATTORNEYS AT LAW

WASHINGTON, D.C.
AUSTIN, TEXAS
SAN ANTONIO, TEXAS
HOUSTON, TEXAS
NEW YORK, NEW YORK

A REGISTERED LIMITED LIABILITY PARTNERSHIP
INCLUDING PROFESSIONAL CORPORATIONS

1700 PACIFIC AVENUE
SUITE 4100
DALLAS, TEXAS 75201-4818
(214) 969-2800
TELEX 732324
FAX (214) 969-4343

BRUSSELS, BELGIUM
MOSCOW, RUSSIA

WRITER'S DIRECT DIAL NUMBER (214) 969-2747

May 4, 1995

Printing Research, Inc.
Attn: Mr. Edwin M. Schaffler,
Exec. Vice President & CFO
10954 Shady Trail
Dallas, Texas 75220

Re: U.S. Patent Application
"Retractable Inking/Coating Apparatus Having Ferris Movement Between
Printing Units"
Inventors: Ronald M. Rendleman, Howard W. DeMoore and John W.
Bird
Our File: B6012

Dear Ed:

The above-identified patent application was filed in the U.S. Patent Office (by
deposit in Post Office Express Mail) on

Thursday, May 4, 1995

I expect to receive postcard notification of the patent application serial number and filing date
and will report this information to you upon receipt. Additionally, I will forward the official
filing receipt to you in due course.

Thank you for entrusting this matter to me, and I appreciate this opportunity to
be of service.

Very truly yours,



Dennis T. Griggs

DTG/kl
Enclosures

PRI 01713



WILLIAMSON PRINTING CORPORATION

6700 Denton Drive Dallas, Texas 75235-4497 214-904-2100 Fax: 214-352-1842 WATS: 800-843-5423

February 11, 1999

Mr. Howard DeMoore
Printing Research
10954 Shady Trail
Dallas, TX 75220

Re: WPC Patent

Dear Howard:

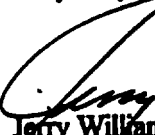
Pursuant to our telephone conversation on this past Friday, February 5, regarding the above referenced, the purpose of this letter is to confirm my understanding on how we agreed to proceed.

It was my impression, that you would present us with a proposal on how you saw us moving forward on this situation. As a matter of fact, I believe you stated that you would send such a proposal early this week. As of this writing, I have not been contacted.

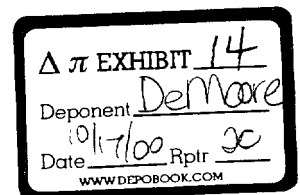
Since I have not heard from you, I became concerned that perhaps we had a misunderstanding. I thought that the "ball was in your court," and have been waiting for you. If my impression is wrong, please let me know, and let us decide how we should proceed.

I would appreciate your response at your earliest convenience, and I am looking forward to hearing from you.

Very truly yours,


Jerry Williamson
Chairman of the Board

cc: Bill Davis
Woody Dixon
Jesse Williamson



CONFIDENTIAL

[illegible]



Key Account Activity Report

JAN 2000

Manager: Steve Garner

Customer									
** Hallmark Cards	Lithoflex	Heidelberg	CD102	1 unit	1st qtr	90%	\$125,000.00		
** Yaquinto Ptg	Lithoflex	Heidelberg	CD102	1 unit	2nd qtr	50%	\$125,000.00		
** Arkay Pkg	Lithoflex	Heidelberg	CD102	1 unit	2-3rd qtr	50%	\$125,000.00		
** Sonoco Cartons	Lithoflex	Komori *	Lithrone	1 unit	3-4th qtr	80%	\$125,000.00		
** Northstate Cartons	Lithoflex	Komori *	Lithrone	2 units	3-4th qtr	50%	\$250,000.00		
** Interdeck Applications		*Need design							
House of Packaging	Lithoflex	Heidelberg	CD102	1 unit	1st qtr	80%	\$125,000.00		
MAN-Roland (demo rm)	Lithoflex	MAN Roland	R700	1 unit	1st qtr	90%	\$105,000.00		
Sprint Press	Lithoflex	MAN Roland	R700	1 unit	2nd qtr	60%	\$125,000.00		
Schiele Graphics	Lithoflex	MAN Roland	R700	1 unit	2nd qtr	60%	\$125,000.00		
International (CE required)									
MAN Roland Italy	Lithoflex	MAN Roland	R700	1 unit	1-2 qtr	70%	\$130,000.00		
P'Auer offset (Swiss)	Lithoflex	MAN Roland	R700	1 unit	2nd qtr	60%	\$150,000.00		
TOTAL							\$1,510,000.00		

00000000000000000000

CONFIDENTIAL

PRI 00488

Δ π EXHIBIT 15
Dependent Bellone
Date 10/17/00 JC
WIDBROOK.COM

THE UNIVERSITY OF CHICAGO

CONFIDENTIAL

Steve Garner

From: Jim L Rasmussen [jrasmu@hallmark.com]
Sent: Friday, February 11, 2000 11:46 AM
To: sgarner@superblue.net
Cc: Lynn R Poretta
Subject: Flexo Printing on Litho Press Patents

Dear Steve:

Thank you for your call this morning. I was happy to hear that you feel your negotiations on the patent involving your equipment has been resolved in your favor.

I am looking forward to the faxed copy of the review you obtained, so that we can share it with our legal department.

Here is another patent that appears to have some similarities, although I have not read it completely and I have not yet submitted it to our legal department. However, you may want to review it just to make sure it doesn't create any complications for you. I just learned of this patent several weeks ago.

Patent No. 5,638,752

Dated April 4, 1994

Applicant: MAN Roland Druckmaschinen AG, Germany

I look forward to your assessment of the claims of this patent.

Have a great weekend.

Jim Rasmussen - 816/274-3898

=====
=====

This email and any attachments may contain confidential information and it is intended for the addressee only. If you are not the intended recipient you should destroy this message and notify the sender by reply email. If you are not the addressee any disclosure, reproduction or transmission of this email is strictly prohibited.

This email has been scanned for viruses, however it is recommended that any attachments are also checked at the addressee's end. We will not be held responsible for any virus that is contracted via this email.

Opinions, conclusions and other information expressed in this email are those of the sender and are not necessarily reflective of the policies and views of the company. No reliance may be placed upon this email without written confirmation of its contents.

=====
=====

CONFIDENTIAL

PRI 00499

**Facsimile Cover Sheet****DATE:** December 15, 1998**TO:** Steve Garner**FAX NO:** (214) 357-5847**FROM:** Jim Rasmussen

Hallmark Cards Inc.
Advancing Technologies Div. - MD 233
Technical Innovation & Development
PO Box 419580
Kansas City, MO 64141-6580

Phone: (816) 274-3898
Email: jrasmu@hallmark.com
Fax No.: (816) 274-7367

Number of pages including cover sheet *9*

Dear Steve:

It was great meeting with you again in Chicago. I trust the show worked out well for you and Printing Research.

The internet web site of patent information is:

<http://www.patents.ibm.com/>

We would be interested in you review and informed interpretation of this patent as it relates to the quotation you provided us on October 31, 1997. (CUV0971031, PROPOSALS 1&2). Our intention was to install a swing down coater on the first or second unit of our press.

Looking forward to your feedback.

Best Regards, Jim Rasmussen

CONFIDENTIAL

PRI 00500

0001-93-12-15-15:55 FAX 81 7367


**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

 Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/01/99	05/20/99	DAVIS	WILL-2501

 ROBERT GARY FAIR
FOUR FOUR FIFTH
700 NORTH FLAKE STREET
SUITE 1000
MILWAUKEE, WI 53201

MM21/0203

EXAMINER

FUNK 5

ART UNIT	PAPER NUMBER
2854	8

DATE MAILED:

02/09/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

CONFIDENTIAL

PRI 00501

Office Action Summary	Application No. 09/315,796	Applicant(s) Davis et al.
	Examiner Stephen R. Funk	Group Art Unit 2654

☐ Responsive to communication(s) filed on _____

☐ This action is FINAL.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 463 O.G. 213.

A shortened statutory period for response to this action is set to expire 7 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-87 is/are pending in the application.
Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-87 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☒ The specification is objected to by the Examiner.

☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
☐ All ☐ Some ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.
☐ received in Application No. (Series Code/Serial Number) _____
☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 4

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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PRI 00502

Serial No. 09/315,796
Art Unit 2854

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The patent sought to be reissued by this application is involved in litigation. Any documents and/or materials, including the defenses raised against validity or against enforceability because of fraud or inequitable conduct, which would be material to the examination of this reissue application are required to be made of record in response to this action.

A protest to request suspension of reissue proceedings has been filed under 37 C.F.R. § 1.291(a) on 9/15/99, and a copy has been served on applicant.

While there is concurrent litigation related to this reissue application, action in this reissue application will NOT be stayed because a stay of that litigation is in effect for the purpose of awaiting the outcome of these reissue proceedings. Note the Order Granting Motion to Stay on 7/6/99 in Paper No. 6 Exhibit E.

Insofar as the Protest raises questions of inventorship there has been no evidence submitted by the Protestor to warrant any rejections under 35 U.S.C. § 102(f) and/or (g).

The original patent, or an affidavit or declaration as to loss or inaccessibility of the original patent, must be received before this reissue application can be allowed. See 37 CFR 1.178.

The reissue oath or declaration filed with this application is defective because:

It must identify each inventor by full name, and each inventor's residence, post office address and country of citizenship as required by 37 C.F.R. § 1.63(a)(3). See M.P.E.P. § 1414 and 37 C.F.R. § 1.175(a).

Additionally, the oath or declaration must state that all errors being corrected in the reissue application "up to the time of the filing of the oath or declaration" arose without any deceptive intention on the part of the applicant as required by 37 C.F.R. § (a)(2).

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It is further noted that applicant has provided what appears to be a total of three separate declarations, "Reissue Declaration", "Declaration and Power of Attorney", and "Application for Reissue of U.S. Patent 5,630,363 under 35 U.S.C. § 251 and 37 C.F.R. § 1.171" and incorrectly utilizes the terminology "sole inventors" in the "Reissue Declaration". It is suggested that applicant provide all of the required information in a single oath or declaration so as to quickly advance prosecution and avoid redundancy and confusion.

Claims 1 - 87 are rejected as being based upon a defective reissue declaration under 35 U.S.C. § 251. See 37 C.F.R. § 1.175.

Applicant is reminded that if any additional amendments are made to the specification, drawings, or claims, a new/supplemental oath or declaration complying with 37 C.F.R. § 1.175(a)(1), (a)(2) and/or (a)(3), (a)(5), (a)(6), and (a)(7) is required.

The disclosure is objected to because of the following informalities: In column 3 line 59 "flexo" should presumably be --flexographic--. In column 4 lines 46 - 49 it appears that the liquid vehicle is applied directly to the impression cylinder per se, not the substrate on the impression cylinder. In claim 57 line 3 "flexography" should presumably be --flexographic--. In claim 78 line 1 "77urther" should be corrected. Appropriate correction is required.

Claims 12 - 14, 19, 21, 22, 52, 54 - 57, 62, 64, 65, and 86 are objected to under 37 C.F.R. 1.75(a) as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 12 subparagraph (4) it appears that the liquid coating image is applied directly to the impression cylinder per se, not the substrate on the impression cylinder. Note also new

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claims 52, 54, and 55.

In claims 19, 21, and 22 it is not clear if the recitations of "colored ink images" refer to the "flexographic color ink image" recited in claim 17 subparagraph (1) or the "additional colored ink images" recited in claim 17 last paragraph. Note claims 18 and 20 for comparison. The terminology should be consistent among the claims. Note also new claims 62, 64, and 65 and, accordingly, claims 61 and 63 for comparison.

In claim 57 lines 2 - 3 "said impression cylinders" lacks any clear antecedent basis as the recitation "at least one" in claim 55 line 7 only positively sets forth one station. This could be corrected by deleting "of" in line 2 and making "cylinders" singular in line 3 which still recites that each and every impression cylinder has an air dryer.

In claim 86 subparagraph (3) "said flexographic materials" lacks any clear antecedent basis.

Claims 49 - 79 and 82 - 87 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 49 depends from claim 44 but appears to be drafted as an independent claim. Accordingly, all of the structure recited in claim 49 would be a double recitation of the same in claim 44.

In independent claims 44, 53, 55, 58, 60, 72, 82, and 86 the terminology of applying "thin, controlled layers" to the substrate has no clear meaning. It is noted that in each of these claims applicant afterwards recites that "images" are printed with the "thin, controlled layers".

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Accordingly, it is not apparent how these recitations differ in scope.

In claim 85 line 2 it is recited that the method combines offset lithography and flexography but there is no specific recitation of printing by flexography in the body of the claim. Accordingly, it is not clear if the method encompasses a combined printing process or not.

In claim 87 lines 7 - 8 it is recited that inks, coatings, "and" slurries are deposited on the substrate but in line 9 it is recited that inks, coatings, "or" slurries may be printed on the substrate. Accordingly, it is not clear if the apparatus prints all three materials or any of the three materials. This claim will be examined with respect to the prior art as if any of the materials are applied since this interpretation more closely corresponds to the specification.

Claims 42 - 87 rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

First, in each of independent claims 44, 53, 55, 58, 60, 72, 80 - 82, and 85 - 87 and dependent claims 42, 43, and 49 the recitations of printing on "both sides, opposite sides, or the reverse side" of the substrate is not supported by the original disclosure. Other than the brief mention of perfecter printing in column 2 lines 54 - 55 with respect to prior art sheet fed presses there is no other discussion of perfecter printing or printing on opposite, both, or the reverse side of the substrate in the original disclosure. Furthermore, the terms "over" and "on top of" are used interchangeably in the specification and in no instance is it implied that sometimes the

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term "over" refers to perfector printing. Specifically, the meaning of the term "over" in context in column 4 lines 29 and 43 (applicant's declaration incorrectly refers to column 5) is no different than the context meaning of "over" in column 4 line 38 (again the declaration incorrectly refers to column 5) and column 6 line 3. Applicant's apparent argument that the use of this term with "overcoating" in the latter two instances clearly implies on the same side of the substrate but the first two instances of "over" with reference to "color images" implies perfector printing is without merit and self serving. Note original claims 29 and 34 in the parent application and column 7 lines 52 - 60 which state that additional "colored ink images" are printed "on top of" the previously printed image, thus, referring to printing on the same side of the substrate which contradicts applicant's assertion. Additionally, the use of the term "over" does not have any connotation of perfector printing in the art without being first preceded by "turning" or "flipping" and only with specific reference to the substrate. Lastly, the Declaration of Raymond J. Prince provides no objective evidence that the term "over" can refer to perfector printing and none of the exhibits provided in this declaration use the term "over" with respect to perfector printing.

Second, in independent claims 44, 53, 55, 58, 60, 72, 82, and 86 the terminology of applying "thin, controlled layers" to the substrate has no support in the original disclosure and, furthermore, has no clear scope or meaning.

Claims 42 - 87 are rejected under 35 U.S.C. 251 as being based upon new matter added to the patent for which reissue is sought.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form

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the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(c) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 - 6, 9 - 20, 22 - 25, and 28 - 38 are rejected under 35 U.S.C. 102(e) as being anticipated by DeMoore et al. (US 5,960,713). DeMoore et al. is ultimately a CIP of S.N. 08/435,798 which has a filing date of 5/4/95. While this patent is a CIP of the earlier application, and could contain subject matter not disclosed in that application, reference can presently be made to EP 741,025 which claims direct priority from S.N. 08/435,798. All references to DeMoore et al. will be made to EP 741,025.

DeMoore et al. teach a first flexographic station (22, 110) for printing either colored inks, white ink, metallic particles, an encapsulated essence, or aqueous or UV coatings on a sheet or web (col. 2 lines 40-45, col. 3 lines 17-21, col. 4 lines 32-35, col. 9 line 47 - col. 10 line 18) and at least one successive lithographic station (24-28) for printing colored inks, aqueous, or UV coatings (col. 4 lines 32-50 and col. 10 lines 19-27). Applicant should carefully

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review the entire document of DeMoore et al. With respect to the flexographic plate, plate cylinder, blanket cylinder, and anilox roller see column 10 lines 4 - 11. With respect to successive flexographic stations see column 6 lines 21 - 27. With respect to the air dryer see column 9 lines 1 - 10. With respect to the waterless inks see column 3 lines 21 - 30 and column 10 lines 19 - 27. With respect to claim 22 the plates would inherently be either solid or halftone.

Claims 7, 8, 21, 26, 27, and 39 - 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeMoore et al. With respect to the size of the metallic particles it would have been obvious to one of ordinary skill in the art to use uniform sized particles to achieve a uniform, flat printed image or non-uniform sized particles to achieve a desired textured appearance. With respect to claim 21 it is widely conventional in the art to make halftone lithographic printing plates to achieve superior image appearance. With respect to claim 39 it would have been obvious to one of ordinary skill in the art to overprint the same image with the same color ink to simply achieve a denser or more opaque color. With respect to the added claims, insofar as they are adequately supported by the original disclosure, DeMoore et al. teach in column 3 lines 17 - 19 that the substrate may be printed on either side. It would have been obvious to one of ordinary skill in the art to selectively print on both sides of the substrate so as to achieve desirable perfecter printing.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In particular note the patents to Wolff (US 3,072,050), Bird (US 4,796,556) and (US 4,841,903), and Koehler et al. (US 5,178,678).

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Applicant's amendments to the specification and prior art are deemed to be merely typographical errors and are accepted without additional comment. The amendments to claims 29 and 34 are not deemed to change the scope of the claims as "over" and "on top of" are used interchangeably in the original disclosure and are considered to have the same meaning. Accordingly, there is no objection to these claims as the scope, for purposes of examination, has not changed.

A shortened statutory period for response to this action is set to expire **ONE MONTH** from the date of this letter.

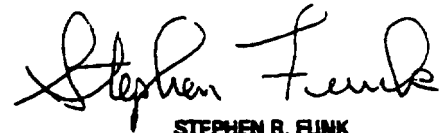
Due to the related litigation status of this reissue application, extensions of time under the provisions of 37 C.F.R. § 1.136(a) will **NOT** be permitted.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Funk whose telephone number is (703) 308-0982. The examiner can normally be reached on Monday - Thursday from 7:30 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Hilten, can be reached at (703) 308-0719. The fax number for incoming official papers is (703) 308-7722, 7724. The fax number for informal papers in Art Unit 2854 is (703) 308-5841.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Stephen Funk
February 3, 2000


STEPHEN R. FUNK
PRIMARY EXAMINER
CONFIDENTIAL

PRI 00510

Form PTO 948 (Rev. 8-98)

U.S. DEPARTMENT OF COMMERCE - Patent and Trademark Office

Application No.

07/315796

NOTICE OF DRAFTSPERSON'S
PATENT DRAWING REVIEWThe drawing(s) filed (insert date) 3/2/99 are:☒ approved by the Draftsperson under 37 CFR 1.84 or 1.152.☒ objected to by the Draftsperson under 37 CFR 1.84 or 1.152 for the reasons indicated below. The Examiner will require submission of new, corrected drawings when necessary. Corrected drawing must be submitted according to the instructions on the back of this notice.

<p>1. DRAWINGS. 37 CFR 1.84(a): Acceptable categories of drawings: Black ink. Color. Color drawings are not acceptable until action is granted. Fig(s) _____ Pencil and non black ink not permitted. Fig(s) _____</p> <p>2. PHOTOGRAPHS. 37 CFR 1.84 (b) 1 full-tone set is required. Fig(s) _____ Photographs not properly mounted (must use crystal board or photographic double-weight paper). Fig(s) _____ Poor quality (half-tone). Fig(s) _____</p> <p>3. TYPE OF PAPER. 37 CFR 1.84(c) Paper not flexible, strong, white, and durable. Fig(s) _____ Erasures, alterations, overwritings, interlineations, folds, copy machine marks not accepted. Fig(s) _____ Mylar, vellum paper is not acceptable (too thin). Fig(s) _____</p> <p>4. SIZE OF PAPER. 37 CFR 1.84(f): Acceptable sizes: 21.0 cm by 29.7 cm (8 1/2 inch x 11 inches) 21.6 cm by 27.9 cm (8 1/2 x 11 inches) All drawing sheets not the same size. Sheet(s) _____ Drawings sheets not an acceptable size. Fig(s) <u>1-3</u></p> <p>5. MARGINS. 37 CFR 1.84(g): Acceptable margins: Top 2.5 cm Left 2.5 cm Right 1.5 cm Bottom 1.0 cm SIZE: A4 Size Top 2.5 cm Left 2.5 cm Right 1.5 cm Bottom 1.0 cm SIZE: 8 1/2 x 11 Margins not acceptable. Fig(s) _____ Top (T) _____ Left (L) _____ Right (R) _____ Bottom (B) _____</p> <p>6. VIEWS. 37 CFR 1.84(h) REMINISCE: Specification may require revision to correspond to drawing changes. Partial views. 37 CFR 1.84(h)(2) Bracketed needed to show figure as one entity. Fig(s) _____ Views not labeled separately or properly. Fig(s) _____ Enlarged view not labeled separately or properly. Fig(s) _____</p> <p>7. SECTIONAL VIEWS. 37 CFR 1.84 (h)(3) Hatching not indicated for sectional portions of an object. Fig(s) _____ Sectional designation should be noted with Arabic or Roman numbers. Fig(s) _____</p>	<p>8. ARRANGEMENT OF VIEWS. 37 CFR 1.84(i) Words do not appear on a horizontal, left-to-right fashion when page is either upright or turned so that the top becomes the right side, except for graphs. Fig(s) _____</p> <p>9. SCALE. 37 CFR 1.84(k) Scale not large enough to show mechanism without crowding when drawing is reduced in size to two-thirds in reproduction. Fig(s) _____</p> <p>10. CHARACTER OF LINES, NUMBERS, & LETTERS. 37 CFR 1.84(l) Lines, numbers & letters not uniformly thick and well defined, clear, durable, and black (poor line quality). Fig(s) _____</p> <p>11. SHADING. 37 CFR 1.84(m) Solid black areas pale. Fig(s) _____ Solid black shading not permitted. Fig(s) _____ Shade lines, pale, rough and blurred. Fig(s) _____</p> <p>12. NUMBERS, LETTERS, & REFERENCE CHARACTERS. 37 CFR 1.84(p) Numbers and reference characters not plain and legible. Fig(s) _____ Figure legends are poor. Fig(s) _____ Numbers and reference characters not oriented in the same direction as the view. 37 CFR 1.84(p)(1) Fig(s) _____ English alphabet not used. 37 CFR 1.84(p)(2) Fig(s) _____ Numbers, letters and reference characters must be at least 32 cm (1/8 inch) in height. 37 CFR 1.84(p)(3) Fig(s) _____</p> <p>13. LEAD LINES. 37 CFR 1.84(q) Lead lines cross each other. Fig(s) _____ Lead lines missing. Fig(s) _____</p> <p>14. NUMBERING OF SHEETS OF DRAWINGS. 37 CFR 1.84(r) Sheets not numbered consecutively, and in Arabic numerals beginning with number 1. Sheet(s) _____</p> <p>15. NUMBERING OF VIEWS. 37 CFR 1.84(u) Views not numbered consecutively, and in Arabic numerals, beginning with number 1. Fig(s) _____</p> <p>16. CORRECTIONS. 37 CFR 1.84(w) Corrections not made from prior PTO-448 dated _____</p> <p>17. DESIGN DRAWINGS. 37 CFR 1.152 Surface shading shows not appropriate. Fig(s) _____ Solid black shading not used for color contrast. Fig(s) _____</p>
<p>COMMENTS</p>	

REVIEWER

DATE

TELEPHONE NO.

ATTACHMENT TO PAPER NO.

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PRI 00511

Notice of References Cited				Application No. 08/315,796	Applicant(s) Davis et al.	
				Examiner Stephen R. Funk	Group Art Unit 2884	Page 1 of 1
U.S. PATENT DOCUMENTS						
		DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
x	A	5,960,713	10/1999	DeMoore et al.	101	137
x	B	4,841,903	6/1989	Bird	118	48
	C					
	D					
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FOREIGN PATENT DOCUMENTS						
		DOCUMENT NO.	DATE	COUNTRY	NAME	CLASS
x	N	741,025	11/1986	EP	DeMoore et al.	
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	P					
	Q					
	R					
	S					
	T					
NON-PATENT DOCUMENTS						
		DOCUMENT (including Author, Title, Source, and Pertinent Pages)				DATE
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	W					
	X					

* A copy of this reference is not being furnished with this Office action.
(See Manual of Patent Examining Procedure, Section 707.05(a).)

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PRI 00512

SEARCHED

Class	Sub.	Date	Exmr.
101	135-138 141-143 450.1 174 178-183 416.1 424.1 424.2 479 483 491 Dig. 29 Dig. 49	2/3/00	JP
118	46		

INTERFERENCE SEARCHED

Class	Sub.	Date	Exmr.

SEARCH NOTES
(INCLUDING SEARCH STRATEGY)

Date	Exmr.

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PRI 00513

FORM 36-27660

ISSUE SLIP STAPLE AREA (for additional cross references)

POSITION	INITIALS	ID NO.	DATE
FEE DETERMINATION	RR	10027	6/15
O.I.P.E. CLASSIFIER			
FORMALITY REVIEW			

INDEX OF CLAIMS

✓	Rejected	N	Non-elected
=	Allowed	I	Interference
+	(Through numeral) Canceled	A	Appeal
+	Restricted	O	Objected

Claim	Date
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If more than 150 claims or 10 actions
staple additional sheet here

PRI 00514

**Facsimile Cover Sheet****DATE:** December 15, 1998**TO:** Steve Garner**FAX NO:** (214)357-5847**FROM:** Jim Rasmussen

ref: Williamson Patent 5,630,365
first awareness by PH informed
to us by Hallmark

Hallmark Cards Inc.
Advancing Technologies Div. - MD 233
Technical Innovation & Development
PO Box 419580
Kansas City, MO 64141-6580

Phone: (816) 274-3898
Email: jrasmu@hallmark.com
Fax No.: (816) 274-7367

Number of pages including cover sheet *9*

Dear Steve:

It was great meeting with you again in Chicago. I trust the show worked out well for you and Printing Research.

The internet web site of patent information is:

<http://www.patents.ibm.com/>

We would be interested in you review and informed interpretation of this patent as it relates to the quotation you provided us on October 31, 1997. (CUV0971031, PROPOSALS 1&2). Our intention was to install a swing down coater on the first or second unit of our press.

Looking forward to your feedback.

Best Regards, Jim Rasmussen

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PRI 00489

0015796 062101
"0015796 062101"



US005630363A

United States Patent [19]

Davis et al.

[11] Patent Number: 5,630,363

[45] Date of Patent: May 20, 1997

[54] COMBINED LITHOGRAPHIC/
FLEXOGRAPHIC PRINTING APPARATUS
AND PROCESS[75] Inventors: BEN L. Davis, Irving; Jesse S.
Williamson, Dallas, both of Tex.[73] Assignee: Williamson Printing Corporation,
Dallas, Tex.

[21] Appl. No.: 515,897

[22] Filed: Aug. 14, 1995

[51] Int. Cl.⁶ B41M 1/18; B41M 7/00;
B41M 1/04; B41F 23/00[52] U.S. Cl. 101/141; 101/181; 101/183;
101/424.1; 101/424.2; 101/479; 101/483;
101/491; 101/DIG. 49[58] Field of Search 101/133-138,
101/141-143, 450.1, 174, 180, 181, 183,
416.1, 424.1, 424.2, 479, 491, DIG. 29,
DIG. 49, 483

[55] References Cited

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5,370,976	12/1994	Williamson et al.	430/358

OTHER PUBLICATIONS

"Pantone® Metallic Integrated Process Color Selector, Pantone Metallic-Brasshatch-Formal", The Pantone Library of Color, 201 Pantone, Inc. 1990, pp. MDP VI-VIII.

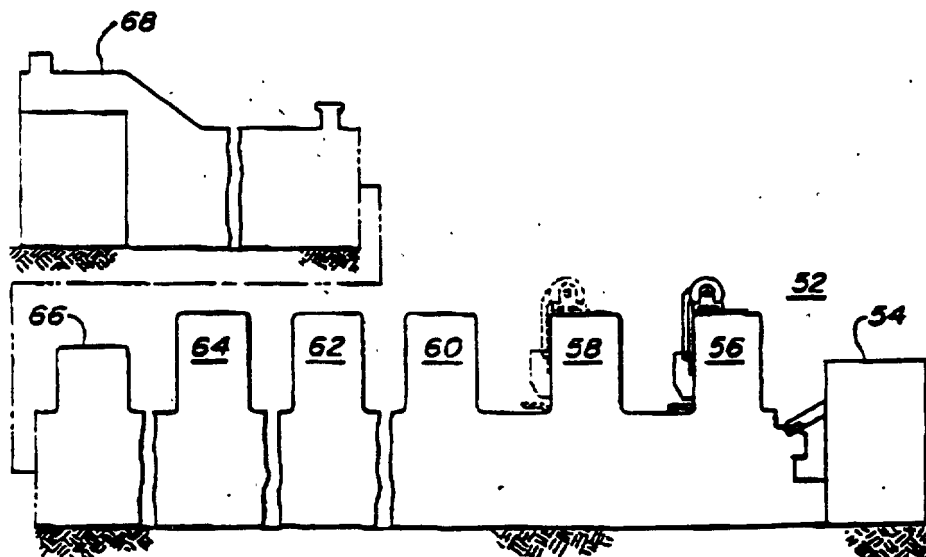
Primary Examiner—Stephen R. Funk
Attorney, Agent, or Firm—Jones, Day, Reavis & Pogue

[57]

ABSTRACT

A combined lithographic/flexographic printing process having a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process. One of the stations prints a first color image using the flexographic process and at least one of the successive printing stations prints a second color image over the first color image using an offset lithographic process in the continuous in-line process.

41 Claims, 1 Drawing Sheet



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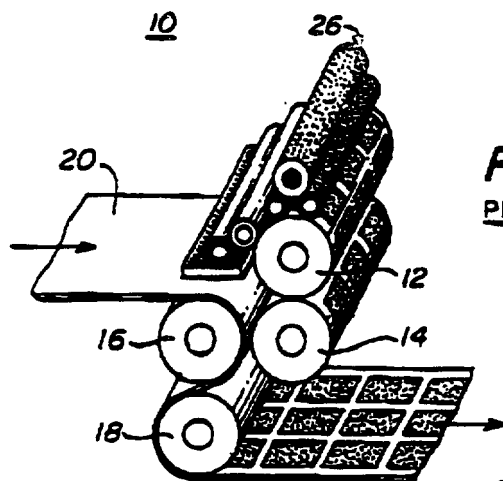


FIG. 1
PRIOR ART

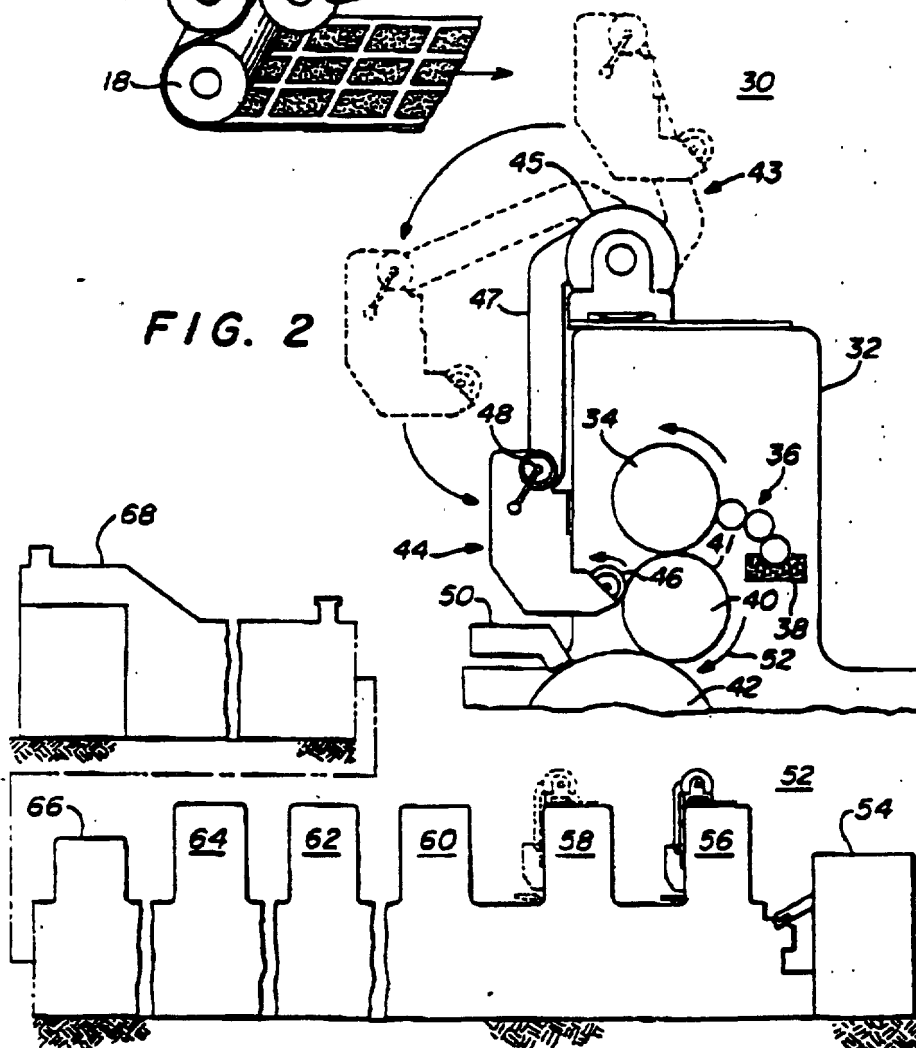


FIG. 2

FIG. 3

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COMBINED LITHOGRAPHIC/ FLEXOGRAPHIC PRINTING APPARATUS AND PROCESS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates in general to printing machines and processes and in particular to a combined lithographic/flexographic in-line printing apparatus and process.

2. Description of Related Art

As used herein, the following terms have the meanings indicated:

ANILOX ROLLER

A steel or ceramic ink metering roller. Its surface is engraved with tiny, uniform cells that carry and deposit a thin, controlled layer of ink film or coating material onto the plate. In flexo presswork, anilox rollers transfer a controlled ink film from the rubber plate (or rubber-covered roller) to the web to print the image. Anilox rollers are also used in remountable glue units and to create "scratch-and-sniff" perfume ads.

ANILUX SYSTEM

The inking method commonly employed on flexographic presses. An anilox-covered fountain roller supplies a controlled ink film from the ink pan to the engraved metering roller. After ink floods the metering roller, the fountain roller is squeezed or wiped usually with a doctor blade to remove the excess ink. The ink that remains on the metering roller is then transferred to the rubber printing plate.

COATER

A device with a pan to contain the coating material, a pan roller partially immersed in the coating material contained in the pan, and a coater roller to meter off a uniform film of the coating material and apply it to the printing plate.

COATING

An unbroken, clear film applied to a substrate in layers to protect and seal it, or to make it glossy.

FLEXOGRAPHIC INK

A quick-drying, fluid ink that is highly volatile or an ink that can be water based and nonvolatile.

FLEXOGRAPHY

A method of rotary letterpress printing characterized by the use of flexible, rubber, or plastic plates with raised image areas and fluid, rapid-drying inks.

HALFTONES

Dot-pattern images that have the appearance of continuous-tone images because of the limited resolving power of the human eye. This limitation accounts for an optical illusion; small halftone dots, when viewed at the normal reading distance, cannot be resolved as individual dots but blend into a continuous tone.

LITHOGRAPHIC PLATES

A lithographic plate is precoated with a light-sensitive or otherwise imageable coating, and the separation between the image and nonimage areas is maintained chemically. The image areas must be ink receptive and refuse water and the nonimage areas must be water receptive and refuse ink. The wider the difference maintained between the ink receptivity of the image areas and the water receptivity of the nonimage areas, the better the plate will be, the easier it will run on the press, and, consequently, the better the printing. There are several types of lithographic plates. The plate is an image carrier that is said to be planographic, or flat and smooth.

LITHOGRAPHY

A printing process in which the image carrier or plate is chemically treated so that the image areas are receptive to ink.

OFFSET PRINTING

An indirect printing method in which the inked image on a press plate is first transferred to a rubber blanket, that in turn "offsets" the inked impression to a press sheet. In offset lithography, the printing plate has been photochemically treated to produce image areas receptive to ink.

SLURRY

A water suspension of fibers or the suspension of pigment and adhesive used to coat paper. It may also include a suspended metallic material such as uniform-sized metal particles or nonuniform-sized metal particles.

ULTRAVIOLET INKS

Printing inks containing an activator that causes the polymerization of binders and solvents after exposure to a source of ultraviolet radiation.

Offset lithography is a process that is well known in the art and utilizes the planographic method. This means that the image and nonprinting areas are essentially on the same plane of a thin metal plate and the distinction between them is maintained chemically. There are two basic differences between offset lithography and other processes. First, it is based on the principle that grease and water do not mix. Second, the ink is offset from the first plate to a rubber blanket and then from the blanket to a substrate on which printing is to occur such as paper.

When the printing plate is made, the printing image is made grease receptive and water repellent and the nonprinting areas are made water receptive and ink repellent. The plate is mounted on the plate cylinder of the press which, as it rotates, comes in contact successively with rollers wet by a water or dampening solution and rollers wet by ink. The dampening solution wets the nonprinting areas of the plate and prevents the ink from wetting these areas. The ink wets the image areas which are transferred to the intermediate blanket cylinder. The inked image is transferred to the substrate as it passes between the blanket cylinder and the impression cylinder. Transferring the image from the plate to a rubber blanket before transfer to the substrate is called the offset principle.

One major advantage of the offset principle is that the soft rubber surface of the blanket creates a clearer impression on a wide variety of paper surfaces and other substrate materials with both rough and smooth textures with a minimum of press preparation.

Offset lithography has equipment for short, medium and long runs. Both sheetfed and web presses are used. Sheetfed lithography is used for printing advertising, books, catalogs, greeting cards, posters, labels, packaging, folding boxes, decalcomanias, coupons, trading stamps, and art reproductions. Many sheetfed presses can perfect (print both sides of the paper) in one pass through the press. Web offset is used for printing business forms, newspapers, preprinted newspaper inserts, advertising literature, catalogs, long-run books, encyclopedias, and magazines.

In offset lithography, the rubber blanket surface conforms to irregular printing surfaces, resulting in the need for less pressure and preparation. It has improved print quality of text and halftones on rough surfaced papers. Further, the substrate does not contact the printing plate thereby increasing plate life and reducing abrasive wear. Also, the image on the plate is right for reading rather than reverse reading. Finally, less ink is required for equal coverage, drying is speeded, and smudging and scum are reduced. Scum is a

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condition that results when wet ink on the surface of the press sheets transfers or sticks to the backs of other sheets in the delivery pile.

Thus, in summary, conventional lithographic offset printing machines or presses comprise one or more image printing stations each having a printing roller or a plate cylinder to which is fastened a thin hydrophilic, oleophobic printing plate having image areas which are oleophilic and hydrophobic and background areas which are oleophobic and hydrophilic. The plate surface is continuously wetted with an aqueous damping solution which adheres only to the background areas and inked with oleo-resinous inks which adhere only to the image areas of the plate as wet ink. The ink is offset transferred to the rubber surface of a contacting blanket cylinder and then retransferred to the receptive surface of a copy web or a succession of copy sheets, such as paper, with an impression cylinder and the ink air dries by oxidation and curing after passing through a drying station.

It is also known to provide the printing machine with a downstream coating station having a blanket roller associated with a coating application unit for the application of an overall protective coating over the entire printed area of the copy sheets or web.

It is known to apply pattern coatings of protective composition by means of blanket rolls by cutting into the rubber surface of the blanket to create raised or relief surface areas which selectively receive the coating composition from the application roll for retransfer to selected areas of the copy sheets in form of pattern coatings. See U.S. Pat. No. 4,796,556.

Lithographic inks are formulated to print from planographic surfaces which use the principle that grease and water do not mix. Lithographic inks are generally very strong in color value to compensate for the lesser amount applied. They are among the strongest of all inks. The average amount of ink transferred to the paper is about half that of letter press because of the double split of the ink film between the plate cylinder and the blanket cylinder and the blanket cylinder and the substrate on the impression cylinder.

Problems occur in the offset lithographic process when attempting to print certain colors such as white and in particular white on other colors such as yellow because the color white will be faint and not sufficiently strong. In such cases, the sheet or paper or substrate requiring the white ink usually has to be run through the same printer several times before the white becomes sufficiently strong.

Further, such colors are not generally printable in an offset lithographic printing process. This means that the sheets or substrate must be removed and transferred to a second type of machine using the flexographic process to apply greater amounts of ink in successive printing runs to achieve the desired print quality.

A like situation occurs with the printing of slurry-type materials such as "scratch-and-sniff" materials which is a liquid vehicle with a slurry containing an encapsulated essence. Such liquid vehicles, because of the nature of the slurry, must be printed with a flexographic process because the anilox roller can supply greater amounts of ink to the flexo plate on the plate cylinder.

Again, when a liquid vehicle with a slurry having suspended material therein such as metallic particles is to be printed, an offset lithographic process cannot be used without the mixing of the aqueous solution with metallic films which cause a dulling of the image. Further, the above-mentioned double split of the ink film adds to the dulling of the image. Therefore, to achieve desired results, the printing must take place with a flexographic printing machine.

Thus, liquid opaque coatings or inks such as white colored ink, scratch-and-sniff vehicles, and slurries with metal particles do not achieve desired results when printed in an offset lithographic process and must be transferred from the offset lithographic in-line machines to a separate machine for printing in a separate run.

Such requirements not only hinder the speed of the printing process but also require additional time and thus increase the cost of the printing.

It would be advantageous to have a continuous in-line process in which not only offset lithographic printing could take place but in which, in the same in-line process, liquid printing vehicles including opaque coatings, such as white ink, and slurries containing encapsulated essences or metallic particles could also be printed and dried not only before the printing of the offset lithographic inks but also in which, after the liquid opaque coatings have been applied, an overcoating could be applied to the printed liquid vehicle image using the lithographic process in the continuous in-line process.

SUMMARY OF THE INVENTION

The present invention provides for a continuous in-line printing process having a plurality of successive printing stations for printing color images on a substrate. At least one of the stations prints a liquid vehicle image on a substrate with an opaque coating using the flexographic process and at least one of the successive printing stations printing a second color image over the liquid vehicle image on the printed substrate using the lithographic process in the continuous in-line process.

In the novel inventive system, a single in-line continuous printing process is used. One of the stations may print a liquid vehicle image on a substrate that contains a slurry with an encapsulated essence therein utilizing the flexographic process. Another one of the stations may apply an overcoating over the liquid vehicle image on the printed substrate using a lithographic process. Still another of the stations may print an aqueous-based vehicle image including a suspended metallic material therein using the flexographic process to form a metallic coating and thereafter at least one of the successive printing stations prints a color image over the aqueous-based vehicle image using the lithographic offset process in the continuous in-line process.

Whenever a station is used for flexographic printing, a flexographic plate image is placed on the blanket cylinder for receiving the liquid vehicle and transferring the liquid vehicle to the impression cylinder for printing. An anilox roller is associated with the flexographic plate for supplying the liquid vehicle which may be an aqueous-based vehicle.

In addition, in such case, a high-velocity air dryer is associated with the impression cylinder of one or more of the printing stations where the printing on the substrate is occurring to assist in drying the ink or liquid vehicle printed on the substrate while it is on or near the impression cylinder, before the substrate arrives at the next successive station for additional printing, or before printing occurs at the next successive station.

Thus, if a liquid vehicle such as white ink is to be printed, it is printed with a flexographic process which deposits a greater amount of ink on the substrate, the ink is dried with a high-velocity air dryer while the substrate is on or near the impression cylinder and prior to the substrate being received by the next successive station. If desired, at the next successive station the printing of the white liquid vehicle may again take place thus ensuring the desired intensity of

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whiteness on the substrate. Subsequently, at the next succeeding station a printing may take place on top of the white printing and such printing may continue at the remaining successive stations.

Thus, it is an object of the present invention to provide a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process and in which some of the stations print using the flexographic process and other of the stations print utilizing the offset lithographic process.

It is also an object of the present invention to print an aqueous-based vehicle image including a suspended metallic material therein using the flexographic process at one printing station and at least one successive printing station printing a color image over the aqueous-based vehicle image using a lithographic process in a continuous in-line process or placing an overcoating over the aqueous-based vehicle image using the flexographic process and then printing at successive stations using the lithographic process.

It is yet another object of the present invention to provide a continuous in-line printing process in which one of the stations prints a liquid vehicle image on the substrate with a slurry containing an encapsulated essence using the flexographic process and at least one of the successive printing stations applies an overcoating over the liquid vehicle image on the printed substrate using the offset lithographic process in a continuous in-line process.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features of the present invention will be more fully disclosed when taken in conjunction with the following DETAILED DESCRIPTION OF THE PRESENT INVENTION in which like numerals represent like elements and in which:

FIG. 1 is a schematic view of a prior art offset lithography printing station;

FIG. 2 is a generalized depiction of a printing station that may be used either as an offset lithographic station or a flexographic printing station and illustrates how the station may be converted from an offset lithographic station to a flexographic station; and

FIG. 3 illustrates the continuous in-line process of the present invention comprising a plurality of printing stations, each of which can be converted from an offset lithographic printing station to a flexographic printing station as well as a final coating station.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

FIG. 1 is a schematic representation of a well-known offset lithography printing station 10 having a plate cylinder 12, a blanket cylinder 14, and an impression cylinder 16. The printing medium or substrate, such as paper 20 either in sheet form or web, is fed over the impression cylinder 16 in printing contact with the blanket cylinder 14 to receive the image and then passes over the paper transfer cylinder 18 with the image printed thereon. An ink system 26, well known in the art, transmits the ink from the ink supply to the plate cylinder 12. This is a typical offset lithography printing station.

As disclosed in U.S. Pat. No. 4,796,556, offset lithographic printing machines generally have a plurality of in-line liquid application stations at least one of which is an ink image printing station for printing lithographic ink images on to suitable receptive copy sheets. The final

downstream liquid application station is a coating application station for printing a protective and/or aesthetic coating over selected portions of or over the entire ink-image printed surface of the copy sheets and can also be used to print metallic coatings or slurry. As stated in U.S. Pat. No. 4,796,556, two liquid application stations are shown, the latter including a coating apparatus and the first station being a conventional offset image printing station. The coating application printing station is one that can be modified to convert it either permanently or intermittently to a coating station from an offset lithographic station.

Such a station is illustrated in FIG. 2 herein. The station 30 comprises a housing 32 which includes therein a plate cylinder 34 that is fed with an ink system of rollers 36 that take ink from an ink supply 38 and transfer it to the plate cylinder 34. A blanket cylinder 40 is in ink transfer relationship with the plate cylinder 34 and the impression cylinder 42 where the image is transferred to a substrate passing between blanket cylinder 40 and impression cylinder 42 as blanket cylinder 40 rotates in the direction of arrow 52. This is a conventional offset lithographic printing station. When it is desired to convert that station into a coater station, the coater apparatus 43 has a coater head 44 including a supply of liquid coating and an anilox roller 46 that can be moved such that it can be in contact with either the blanket cylinder 40 for direct printing or the plate cylinder 34 for offset printing. In this case, the ink rollers 36 for the lithographic system are removed from engagement with the plate cylinder 34 in a well-known manner. The coater unit 43 includes a motor device 45, an arm 47, and a pivotal connection 48 that connects the coater head 44 with the remainder of the assembly.

As stated previously, the offset lithographic machine of FIG. 2 is converted as shown therein to a coater that is used only in the last stage of an in-line printing process. It has not been able to be used in stages other than the last printing station because the ink that is placed on the blanket cylinder by means of an anilox roller is still wet when it arrives at the subsequent stations, thus causing smearing of the printed material and causing a general impossibility of printing other information thereon. However, applicant has modified the station shown in FIG. 2 by the addition of a high-velocity air dryer 50 that is associated with the impression cylinder 42 directly after the ink is transferred from the blanket cylinder to the substrate on the impression cylinder. Thus by using flexographic inks, or aqueous coatings which are naturally quick-drying inks, and the high-velocity air dryer 50 located at the point where the ink is applied to the substrate on the impression cylinder, the ink is sufficiently dried when it passes to the next station that further printing can take place on the printed substrate.

Thus, as shown in FIG. 3, a conventional in-line offset lithographic printing machine 52 is shown having an apparatus to feed paper into the said machine, referred to as a feeder 54, printer, cutters 56, 58, 60, 62, and 64, and a crating station 66. A delivery station 68 receives the printed material or substrates. Thus there are a plurality of successive printing stations 56, 58, 60, 62, and 64 for printing color images on the substrate in a continuous in-line process. Any one of the printing stations 56-64 can be modified as generally shown therein and as illustrated in FIG. 2 to print a first color image using the flexographic process. The succeeding printing stations can then print a second color image over the first color image using the lithographic process in the continuous in-line process. As illustrated in FIG. 2, the flexographic process printing station includes the blanket cylinder 40 and the impression cylinder 42. A

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flexographic plate 41 on the blanket cylinder 40 has an image thereon for receiving the first color from the anilox roller 46 and transferring that first color image to the impression cylinder 42 for printing on the substrate. The high-velocity air dryer 50 thus dries the flexographic ink on the substrate and passes the substrate to the subsequent printing station. Thus in FIG. 3, station 56 may be modified as generally shown therein and as illustrated in FIG. 2 and a flexographic ink can be printed thereon at station 56, dried by the high-velocity air dryer 50, and coupled to subsequent in-line stations 58-64 for further printing a second or more color images over the first color image using the offset lithographic process in a continuous in-line process. The flexographic printing station shown in FIG. 2 may print a liquid vehicle image on the substrate with a slurry containing an encapsulated essence. At least one of the successive printing stations 58-64 an overcoating may be applied over the liquid vehicle image on the printed substrate using the flexographic process in the continuous in-line process. The overcoating may be an aqueous overcoating, or an ultraviolet overcoating. In addition, the substrate may be a sheet or a web 20 as illustrated in FIG. 1 or it may be single sheet fed in the continuous in-line process from the stack sheets shown at 54 in FIG. 3.

Further, the modified flexographic printing station 58 shown in FIG. 2, as stated previously, may be any one of the stations 56-64 in FIG. 3, and as illustrated by stations 56 and 58, and may print an aqueous-based vehicle image including a suspended metallic material therein using the flexographic process to form a metallic coating. Again, after it is dried by the high-velocity air dryer 50, it may be passed to one of the successive printing stations for printing a color image over the aqueous-based vehicle image using the offset lithographic process in the continuous in-line process. The suspended material may include uniform-sized metal particles to form the metallic coating or it may include nonuniform or multiple-sized metal particles to form the metallic coating.

The present invention is especially useful when a liquid opaque coating must be printed such as a white color ink. In that case, it may be desirable to have both stations 56 and 58 modified as shown in FIG. 3 and as illustrated in detail in FIG. 2. In such case, the anilox roller 46 at each station delivers the white ink in the same pattern to the flexographic plate 41 on the blanket cylinder 40 for transfer to the substrate on the impression cylinder 42. As the substrate passes the high-velocity drying station 50, the ink is dried and the second station may again print the same white pattern on the substrate to increase the quality of the white ink appearance after it is applied to the substrate.

Thus, the station or stations that are converted to flexographic printing stations may have an ink-providing means 46 at the printing station for applying a flexographic ink to the blanket cylinder to form the image. A substrate receives the flexographic ink image transfer from the blanket cylinder and at least one subsequent printing station in the in-line process receives the image-printed substrate and prints an additional coated ink image on the substrate on top of the flexographic ink image using offset lithography. The additional colored ink images that can be printed on top of the flexographic ink images can be conventional lithographic inks or waterless inks.

Further, the colored ink images may be printed with halftone screening processes. The flexographic ink image and the colored ink images may also be printed in solids and/or halftone printing plates in sequence and in registry in successive printing stations to produce a multicolored image on the substrate. Further, the printing apparatus may include a sheetfed press or a web press.

In the present invention, at least one of the flexographic printing stations prints an image with liquid vehicle slurry containing an encapsulated essence. In another embodiment, at least one of the printing stations prints an image with a water-based liquid vehicle containing suspended particles that are either uniform or nonuniform in size. The suspended particles may be metallic particles up to substantially 16 microns in diameter.

The present invention may also use the metallic color printing process as disclosed in commonly assigned U.S. Pat. No. 5,370,976 incorporated herein by reference in its entirety.

In one aspect, the novelty of the present invention is to create a flexographic printing station that can be used at one of a plurality of printing stations in a continuous in-line process and in which, at a subsequent printing station, a lithographic process may be used to print over the liquid vehicle printed by the flexographic station.

Thus, there has been disclosed an apparatus for a combined lithographic/flexographic printing process that includes a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process and wherein one of the stations prints a first color image using the flexographic process and at least one of the successive printing stations prints a second color image over the first color image using the lithographic process in the continuous in-line process.

While the invention has been described in connection with a preferred embodiment, it is not intended to limit the scope of the invention to the particular form set forth, but, on the contrary, it is intended to cover such alternatives, modifications, and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

We claim:

1. Apparatus for a combined lithographic/flexographic printing process comprising:

a substrate;

a plurality of successive printing stations for printing color images on the substrate in a continuous in-line process;

one of said stations comprising a flexographic printing station for printing a liquid vehicle image on said substrate with a slurry containing an encapsulated essence using the flexographic process;

at least one of said successive printing stations being a lithographic printing station; and

an overcoating applied over the liquid vehicle image on the printed substrate at at least one of said successive lithographic printing stations using the lithographic process in said continuous in-line process.

2. Apparatus as in claim 1 wherein said overcoating is an aqueous overcoating.

3. Apparatus as in claim 1 wherein said overcoating is an ultraviolet ink overcoating.

4. Apparatus as in claim 1 wherein:
said substrate is a paper sheet; and
said apparatus includes a sheet feeder.

5. Apparatus as in claim 1 wherein:
said substrate is a web; and
said apparatus includes a web feeder.

6. Apparatus for a combined lithographic/flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process;

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- one of said stations comprising a flexographic printing station printing an aqueous-based vehicle image using the flexographic process to form a metallic coating;
1. suspended metallic material being included in said aqueous-based vehicle image; and
- at least one of the successive printing stations comprising an offset lithographic printing station printing a color image over the aqueous-based vehicle image using the offset lithographic process in said continuous in-line process.
7. Apparatus as in claim 6 wherein said suspended material includes uniform-sized metal particles to form said metallic coating.
8. Apparatus as in claim 6 wherein said suspended material includes nonuniform-sized metal particles to form said metallic coating.
9. Apparatus as in claim 6 further including: said flexographic printing station including a plate cylinder having a flexographic plate thereon, a blanket cylinder, and an impression cylinder;
- a flexographic plate image transferred from said plate cylinder to said blanket cylinder, said image being formed of said metallic coating, said blanket cylinder transferring said metallic coating to said impression cylinder for printing said flexographic plate image on said substrate; and
- an anilox roller associated with said flexographic plate for supplying said aqueous-based vehicle containing said suspended metallic material to said flexographic plate.
10. Apparatus for creating a combined lithographic/flexographic printing process comprising:
- a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process;
- one of said stations comprising a flexographic printing station for printing a first color image using the flexographic process; and
- at least one of the successive printing stations comprising an offset lithographic printing station for printing a second color image over the first color image using the offset lithographic process in said continuous in-line process.
11. Apparatus as in claim 10 further including:
- said flexographic printing station including a plate cylinder, a blanket cylinder, and an impression cylinder;
- a flexographic plate on said plate cylinder;
- an anilox roller associated with said flexographic plate for supplying a first color to said flexographic plate to form said first color image; and
- said blanket cylinder receiving said first color image from said plate cylinder and transferring said first color image to said impression cylinder for printing on said substrate.
12. Apparatus for creating a combined lithographic/flexographic printing process comprising:
- a substrate;
- a plurality of successive printing stations for printing color images on the substrate in a continuous in-line process;
- at least two successive ones of said printing stations being flexography stations and comprising:
- (1) a supply of liquid coating;
- (2) a plate cylinder associated with a blanket cylinder, said plate cylinder having a flexographic plate thereon;

- (3) an anilox roller associated with said liquid supply coating and said plate cylinder for delivering said liquid coating to said flexographic plate to form an image for transfer to said blanket cylinder;
- (4) an impression cylinder for receiving said liquid coating image transferred from said blanket cylinder and printing said image on said substrate, said at least two flexography stations printing the same liquid coating image in sequence and in superimposed relationship; and
- at least one offset lithographic printing station for receiving said substrate and printing over said liquid coating image.
13. Apparatus as in claim 12 wherein said liquid coating image printed on said substrate is a white color ink.
14. Apparatus as in claim 12 further including an air dryer associated with each of said impression cylinders on said flexography stations, said air dryer having sufficient air velocity for drying said liquid coating before the substrate is transferred to the successive printing station in said continuous in-line process.
15. Apparatus for a combined lithographic/flexographic printing process comprising:
- a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process, said printing stations including both lithographic and flexographic printing stations;
- a blanket cylinder at at least a first one of said flexographic printing stations;
- flexographic ink-providing means at said at least first one of said flexographic printing stations for applying a flexographic ink to said blanket cylinder to form an image;
- a substrate for receiving said flexographic ink image transferred from said blanket cylinder; and
- at least one subsequent lithographic printing station in said in-line process for receiving said image printed substrate and printing an additional colored ink image on said substrate on top of said flexographic ink image using offset lithography.
16. Apparatus as in claim 15 further comprising:
- a plate cylinder at said at least first one of said flexographic stations;
- a flexographic plate on said plate cylinder for receiving and transferring said flexographic ink to said blanket cylinder; and
- said flexographic ink-providing means including a flexographic ink supply and an anilox roller associated with said flexographic ink supply for transferring said flexographic ink to said flexographic plate.
17. Apparatus for a combined lithographic/flexographic printing process for printing a multicolored image comprising:
- a plurality of successive printing stations for printing color on a substrate in a continuous in-line process, said printing stations including both lithographic and flexographic printing stations;
- at least one of said flexographic printing stations having:
- (1) a plate cylinder and a blanket cylinder, said plate cylinder including a flexographic plate having an image thereon for transferring a flexographic color ink image to said blanket cylinder;
- (2) an etched anilox roller for applying a flexographic color ink to said flexographic plate on said plate cylinder;

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(3) an impression cylinder in ink-transfer relationship with said blanket cylinder for transferring said flexographic color ink images from said blanket cylinder to said substrate; and

at least one of said succeeding printing stations being a lithographic printing station using offset lithography for printing additional colored ink images on top of said flexographic ink image.

18. Apparatus as in claim 17 wherein said additional colored ink images are formed with lithographic inks.

19. Apparatus as in claim 17 wherein said colored ink images are formed with waterless inks.

20. Apparatus as in claim 17 further including an air dryer adjacent to said impression cylinder for drying the flexographic ink image transferred to said substrate before said additional colored ink images are printed thereon.

21. Apparatus as in claim 17 further including halftone printing plates for printing said colored ink images.

22. Apparatus as in claim 17 wherein said flexographic ink image and said colored ink images are printed as solid colors and/or with halftone printing plates in sequence and in registry in said successive printing stations to produce said multicolored image on said substrate.

23. Apparatus as in claim 17 wherein said printing apparatus includes a sheet-fed press.

24. Apparatus as in claim 17 wherein at least one of said flexographic printing stations prints said flexographic ink image with liquid vehicle slurry containing an encapsulated essence.

25. Apparatus as in claim 17 wherein at least one of said printing stations prints said flexographic ink image with a water-based liquid vehicle containing suspended particles.

26. Apparatus as in claim 25 wherein said suspended particles are uniform in size.

27. Apparatus as in claim 25 wherein said suspended particles are nonuniform in size.

28. Apparatus as in claim 25 wherein said suspended particles are metallic particles.

29. A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

providing a plurality of successive lithographic/flexographic printing stations for printing colored ink images on a substrate;

printing a flexographic ink image on said substrate at at least one of said flexographic stations;

transferring said printed substrate to at least one subsequent printing station in said continuous in-line process; and

printing colored ink images on top of said flexographic ink image at at least one of said subsequent lithographic printing stations with an offset lithographic process.

30. A method as in claim 29 further comprising the step of drying said flexographic ink image on said substrate with an air dryer prior to printing said colored ink images thereon.

31. A method as in claim 29 further including the step of printing a coating on top of said colored ink images at one of said plurality of subsequent printing stations.

32. A method as in claim 29 wherein said colored inks forming said colored ink images are waterless.

33. A method as in claim 29 wherein said colored inks forming said colored ink images are in a solvent-based liquid vehicle.

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34. A method as in claim 29 further including the steps of printing a slurry on said substrate at any of said printing stations in said continuous in-line process;

using an encapsulated essence in said slurry; and

printing an overcoating over said slurry at a subsequent printing station in said in-line process to protect said essence.

35. A method as in claim 34 further including the step of printing an aqueous-based coating over said slurry.

36. A method as in claim 34 further including the step of printing an ultraviolet coating over said slurry.

37. A method of combining offset lithography and flexographic printing in a continuous in-line process comprising the steps of:

providing a substrate;

applying a flexographic ink to a blanket cylinder in a pattern with a coating head at a first flexographic printing station;

transferring said pattern of flexographic ink from said blanket cylinder to the substrate; and

printing a waterless ink pattern over said flexographic ink pattern on said substrate at at least one subsequent offset lithographic printing station in said continuous in-line process.

38. A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

printing an aqueous-based vehicle image having suspended particles thereon on a substrate at a first flexographic printing station;

transferring said image printed substrate to at least one additional printing station in said continuous in-line process; and

printing additional colored ink images on said printed substrate over said aqueous-based vehicle image in an offset lithographic process at said at least one additional printing station in said in-line process.

39. A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

(1) providing a plurality of successive printing stations for printing liquid vehicle images on a substrate in said in-line continuous process;

(2) utilizing an anilox roller to transfer a liquid ink as said liquid vehicle to a flexographic plate image at at least one of said printing stations;

(3) printing said liquid ink from said flexographic plate image to a substrate;

(4) transferring said printed substrate with said liquid ink image to a subsequent printing station in said in-line printing process;

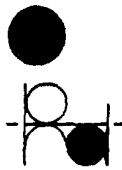
(5) repeating steps (2)-(4) at subsequent printing stations in said in-line process to achieve a desired opacity ink image on said substrate; and

(6) printing an ink pattern over said flexographic ink image using an offset lithographic process.

40. A method as in claim 39 further including the step of additionally printing colored ink images over said liquid ink image on said substrate at subsequent ones of said printing stations in said in-line process.

41. A method as in claim 40 wherein said liquid ink is an opaque white color.

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Printing Research, Inc.

"Mark-less" Super Blue®

October 31, 1997

Jim Rasmussen
Hallmark Cards
2501 McGee
Kansas City, MO 64141

816-274-3898 (Phone)
816-274-7367 (Fax)

Dear Jim,

Per your request, we have enclosed product information and the following **Printing Research** proposal for installation on your:

HEIDELBERG 102 CD, 40 inch press

We propose:

A **Printing Research CUV 'Cold' UV Drying System**

A **Printing Research EZ Lithoflex™ Coater**

The benefits to you of installing the **Printing Research Drying Systems** are as follows:

Printing Research 'Cold' UV:

- Minimal ozone production.
- Ambient temperature controlled environment within the press
- Freedom to run heat sensitive materials
- Guaranteed 1,000 hour lamp life

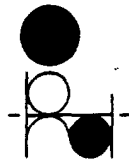
The benefit to you of installing the **Printing Research Coating system** are as follows:

Printing Research EZ Lithoflex™ Coater:

- Ability to run greater coating film weight
- Even pattern coating without edge build-up
- Consistent overall coating without streaks
- Sealed doctor blade assembly
- Minimized wash up procedures
- Ability to run water based metallics and speciality coating

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PRI 00515



Printing Research, Inc.

"Mark-less" Super Blue®

Hallmark Cards
Continued..

We look forward to serving your needs and thank you for your interest in the Printing Research range of products. For more information please call me at (214) 354-1800 or at Printing Research Corporate Headquarters (214) 353-9000.

Sincerely yours,

Daryl Anderson
Sales representative
DA: JM

TOP SECRET

CONFIDENTIAL

PRI 00516



Printing Research, Inc.

"Mark-less" Super Blue[®]

CUV0971031
Hallmark Cards
October 31, 1997

PROPOSAL 1
for
PRINTING RESEARCH CUV[™] 'COLD' UV DRYING SYSTEM

<u>PRESS</u>	<u>COLOR/SIZE</u>	<u>LAMPS</u>	<u>RATING</u>	<u>PRICE</u>
HEIDELBERG CD 102	40	1	400 watt/inch	\$ 45,119.

RECOMMENDED SPARE PARTS:

1	UV Lamps (each)	\$ 372.
1	Filter Tubes (each)	\$ 697.

PURPOSE

Curing (drying) UV inks, varnishes or coating on sheet or web fed presses.

APPLICATION

Paper, Card, Carton Board, Corrugated, Plastic, Foil

CONFIGURATION

Curing heads are linked to impression of press and automatically switch to standby mode when press is off impression for five minutes. If no further action is taken, then lamps automatically turn off; if the press is put back into impression, the lamps automatically return to full power.

Standard Control Unit contains all necessary switchgear and controls to provide individual lamp selection, full and reduced individual power switching, elapsed life meters, lamp indicators and emergency stop button.

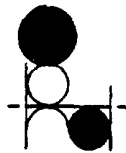
Main power transformer, capacitor banks and closed loop exchanger plant are supplied as floor standing modules. Full safety interlock circuits are fitted throughout.

Enclosures: Sales Terms and Conditions .
Terms of Proposal

CONFIDENTIAL

PRI 00517

00345796-052401
FOI 250-9625769



Printing Research, Inc.

"Mark-less" Super Blue®

Lithoflex Coater0971031

Hallmark Cards

October 31, 1997

PROPOSAL
for
PRINTING RESEARCH EZ™ LITHOFLEX™ COATER

<u>PRESS</u>	<u>COLOR/SIZE</u>	<u>PRICE</u>
HEIDELBERG 102 CD	40	\$ 124,897.

RECOMMENDED SPARE PARTS:

One Spare Laser Engraved Anilox Roll Assembly
One Spare Doctor Blade Assembly

PURPOSE

Application of aqueous or UV based metallic/opaque inks, pearlescents or other specialized coatings to the blanket cylinder of a press unit for overall or pattern coating for downstream overprinting in a single press.

APPLICATION

Paper, Card, Carton Board, Corrugated, Plastic, Foil

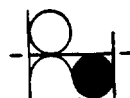
CONFIGURATION

Speed control of the Anilox applicator roll is maintained through throttling valves linked to a tacho-generator. Start/Stop controls are interlocked with press controls to suit. The Anilox applicator roll is laser engraved ceramic. The doctor blade assembly coating chamber is a specially sealed unit with a positive pump drain. Automatic cleaning recirculation system.

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Enclosures: Sales Terms and Conditions
Terms of Proposal

PRI 00518



Printing Research, Inc.
"Mark-less" Super Blue®

CUV.SUM0971031
Hallmark Cards
October 31, 1997

SUMMARY OF PROPOSAL 1
for
HEIDELBERG 102 CD

<u>QTY</u>	<u>EQUIPMENT</u>	<u>PRICE</u>
1	PRINTING RESEARCH ONE LAMP CUV 'COLD' UV DRYING SYSTEM (CUV)	\$ 45,119.
1	PRINTING RESEARCH EZ LITHOFLEX COATER	<u>\$ 124,897.</u>

TOTAL EQUIPMENT (FOB Factory) \$ 170,016.
(INCLUDES MECHANICAL INSTALLATION AND TRAINING)

FREIGHT PREPAID AND ADDED TO INVOICE.
AIRFARES ARE BILLED SEPARATELY.

'Proposal', 'Sales Terms and Conditions' on Reverse Side and 'Terms of Proposal' Accepted by:

NAME _____

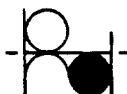
TITLE _____

SIGNATURE _____

DATE _____

CONFIDENTIAL

PRI 00519



Printing Research, Inc.

"Mark-less" Super Blue[®]

CUV0971031
Hallmark Cards
October 31, 1997

PROPOSAL 2
for
PRINTING RESEARCH CUVTM 'COLD' UV DRYING SYSTEM

<u>PRESS</u>	<u>COLOR/SIZE</u>	<u>LAMPS</u>	<u>RATING</u>	<u>PRICE</u>
HEIDELBERG CD 102	40	2	400 watt/inch	\$ 78,721.

RECOMMENDED SPARE PARTS:

1	UV Lamps (each)	\$ 372.
1	Filter Tubes (each)	\$ 697.

PURPOSE

Curing (drying) UV inks, varnishes or coating on sheet or web fed presses.

APPLICATION

Paper, Card, Carton Board, Corrugated, Plastic, Foil

CONFIGURATION

Curing heads are linked to impression of press and automatically switch to standby mode when press is off impression for five minutes. If no further action is taken, then lamps automatically turn off; if the press is put back into impression, the lamps automatically return to full power.

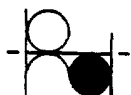
Standard Control Unit contains all necessary switchgear and controls to provide individual lamp selection, full and reduced individual power switching, elapsed life meters, lamp indicators and emergency stop button.

Main power transformer, capacitor banks and closed loop exchanger plant are supplied as floor standing modules. Full safety interlock circuits are fitted throughout.

Enclosures: Sales Terms and Conditions
Terms of Proposal

CONFIDENTIAL

PRI 00520



Printing Research, Inc.

"Mark-less" Super Blue®

CUV.SUM0971031

Hallmark Cards

October 31, 1997

SUMMARY OF PROPOSAL 2

for

HEIDELBERG 102 CD

<u>QTY</u>	<u>EQUIPMENT</u>	<u>PRICE</u>
1	PRINTING RESEARCH TWO LAMP CUV`COLD` UV DRYING SYSTEM (CUV)	\$ 78,721.
1	PRINTING RESEARCH EZ LITHOFLEX COATER	<u>\$124,897.</u>
TOTAL EQUIPMENT (FOB Factory) (INCLUDES MECHANICAL INSTALLATION AND TRAINING)		\$ 203,618.
FREIGHT PREPAID AND ADDED TO INVOICE. AIRFARES ARE BILLED SEPARATELY.		

`Proposal', `Sales Terms and Conditions' on Reverse Side and `Terms of Proposal' Accepted by:

NAME _____

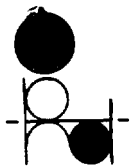
TITLE _____

SIGNATURE _____

DATE _____

CONFIDENTIAL

PRI 00521



Printing Research, Inc.

"Mark-less" Super Blue

CUV0971031
Hallmark Cards
October 31, 1997

PROPOSAL 3
for
PRINTING RESEARCH CUV™ 'COLD' UV DRYING SYSTEM

<u>PRESS</u>	<u>COLOR/SIZE</u>	<u>LAMPS</u>	<u>RATING</u>	<u>PRICE</u>
HEIDELBERG CD 102	40	3	400 watt/inch	\$ 101,031.

RECOMMENDED SPARE PARTS:

1	UV Lamps (each)	\$ 372.
1	Filter Tubes (each)	\$ 697.

PURPOSE

Curing (drying) UV inks, varnishes or coating on sheet or web fed presses.

APPLICATION

Paper, Card, Carton Board, Corrugated, Plastic, Foil

CONFIGURATION

Curing heads are linked to impression of press and automatically switch to standby mode when press is off impression for five minutes. If no further action is taken, then lamps automatically turn off; if the press is put back into impression, the lamps automatically return to full power.

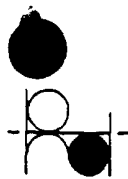
Standard Control Unit contains all necessary switchgear and controls to provide individual lamp selection, full and reduced individual power switching, elapsed life meters, lamp indicators and emergency stop button.

Main power transformer, capacitor banks and closed loop exchanger plant are supplied as floor standing modules. Full safety interlock circuits are fitted throughout.

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Enclosures: Sales Terms and Conditions .
Terms of Proposal

PRI 00522



Printing Research, Inc.
"Mark-less" Super Blue®

CUV.SUM0971031
Hallmark Cards
October 31, 1997

SUMMARY OF PROPOSAL 3
for
HEIDELBERG 102 CD

<u>QTY</u>	<u>EQUIPMENT</u>	<u>PRICE</u>
1	PRINTING RESEARCH TWO LAMP CUV 'COLD' UV DRYING SYSTEM (CUV)	\$101,031.
1	PRINTING RESEARCH EZ LITHOFLEX COATER	<u>\$124,897.</u>
TOTAL EQUIPMENT (FOB Factory) (INCLUDES MECHANICAL INSTALLATION AND TRAINING)		\$ 225,928.
FREIGHT PREPAID AND ADDED TO INVOICE. AIRFARES ARE BILLED SEPARATELY.		

'Proposal', 'Sales Terms and Conditions' on Reverse Side and 'Terms of Proposal' Accepted by:

NAME _____

TITLE _____

SIGNATURE _____

DATE _____

CONFIDENTIAL

PRI 00523

TOTAL 954,516.60

TIME SPENT ON WILLIAMSON COATER PROJECT IN 1995			
EMPLOYEE NAMES	1995 W-2 EARNINGS	% OF EARNINGS	TOTAL EARNINGS
Argenbright, Bryan	32,701.78	10%	3,270.18
Aylor, John	74,084.37	6%	4,445.06
Baker, Steve	77,394.19	10%	7,739.42
Bird, John	122,071.24	15%	18,310.69
Bird, Warren	49,379.99	10%	4,938.00
Branson, Andy	102,550.47	15%	15,382.57
Britton, Terry	49,315.84	30%	14,794.75
Busch, Marilyn	27,070.84	15%	4,060.63
Butler, Richard	56,158.62	15%	8,423.79
DeMoore, Howard	413,997.78	3%	12,419.93
Douglas, Dave	111,197.97	15%	16,679.70
Drosihn, Leon	39,100.80	45%	17,595.36
Garner, Steve	112,341.87	10%	11,234.19
Hennesay, D.J.	39,588.72	60%	23,753.23
Henry, Ken	57,712.47	5%	2,885.62
Hooper, Gari	44,930.55	5%	2,246.53
Kelly, Pete	43,772.79	15%	6,565.92
Lotspiech, Larry	43,268.63	20%	8,653.73
McCraw, Hugh	73,212.47	15%	10,981.87
McPhail, Ken	57,330.77	5%	2,866.54
Pizzillo, David	40,154.53	55%	22,084.99
Ramsey, Charley	58,438.77	5%	2,921.94
Rendleman, Ron	66,964.37	80%	53,571.50
Schaffler, Ed	207,470.37	3%	6,224.11
Simmons, Charles	32,140.23	45%	14,463.10
Townsend, Ed	42,413.42	5%	2,120.67
Villarreal, Jose	12,576.00	30%	3,772.80
29	2,116,938.40		332,005.36
(Shaded areas are actual time spent at Williamson on this coater)			
Cost Estimate/Interstation "Flexo" EZI Coater & Lift Unit			
for Materials & Overhead only (not including labor) -			44,555.00
Rework Materials	-		92,549.38
TOTAL -			469,109.74



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PRI 00345

TIME SPENT ON WILLIAMSON COATER PROJECT IN 1995

EMPLOYEE NAMES	% OF EARNINGS	TOTAL EARNINGS
Argenbright, Bryan	10%	3,270.18
Aylor, John	6%	4,445.06
Baker, Steve	10%	7,739.42
Bird, John	15%	18,310.69
Bird, Warren	10%	4,938.00
Branson, Andy	15%	15,382.57
Britton, Terry	30%	14,794.75
Busch, Marilyn	15%	4,060.63
Butler, Richard	15%	8,423.79
DeMoore, Howard	3%	12,419.93
Douglas, Dave	15%	16,679.70
Drosihn, Leon	45%	17,595.36
Garner, Steve	10%	11,234.19
Hennesay, D.J.	60%	23,753.23
Henry, Ken	5%	2,885.62
Hooper, Gari	5%	2,246.53
Kelly, Pete	15%	6,565.92
Lotspiech, Larry	20%	8,653.73
McCraw, Hugh	15%	10,981.87
McPhail, Ken	5%	2,866.54
Pizzillo, David	55%	22,084.99
Ramsey, Charley	5%	2,921.94
Rendleman, Ron	80%	53,571.50
Schaffler, Ed	3%	6,224.11
Simmons, Charles	45%	14,463.10
Townsend, Ed	5%	2,120.67
Villarreal, Jose	30%	3,772.80
29		332,005.36

(Shaded areas are actual time spent at Williamson on this coater)

Cost Estimate/Interstation "Flexo" EZI Coater & Lift Unit
for Materials & Overhead only (not in 44,555.00

376,560.36

CONFIDENTIAL

09315736 052101
 TOTAL 332,005.36

TIME SPENT ON WILLIAMSON COATER PROJECT IN 1995			
EMPLOYEE NAMES	1995 W-2 EARNINGS	% OF EARNINGS	TOTAL EARNINGS
Argenbright, Bryan	32,701.78	10%	3,270.18
Aylor, John	74,084.37	6%	4,445.06
Baker, Steve	77,394.19	10%	7,739.42
Bird, John	122,071.24	15%	18,310.69
Bird, Warren	49,379.99	10%	4,938.00
Branson, Andy	102,550.47	15%	15,382.57
Britton, Terry	49,315.84	30%	14,794.75
Busch, Marilyn	27,070.84	15%	4,060.63
Butler, Richard	56,158.62	15%	8,423.79
DeMoore, Howard	413,997.78	3%	12,419.93
Douglas, Dave	111,197.97	15%	16,679.70
Drosihn, Leon	39,100.80	45%	17,595.36
Garner, Steve	112,341.87	10%	11,234.19
Hennesay, D.J.	39,588.72	60%	23,753.23
Henry, Ken	57,712.47	5%	2,885.62
Hooper, Gari	44,930.55	5%	2,246.53
Kelly, Pete	43,772.79	15%	6,565.92
Lotspiech, Larry	43,268.63	20%	8,653.73
McCraw, Hugh	73,212.47	15%	10,981.87
McPhail, Ken	57,330.77	5%	2,866.54
Pizzillo, David	40,154.53	55%	22,084.99
Ramsey, Charley	58,438.77	5%	2,921.94
Rendleman, Ron	66,964.37	80%	53,571.50
Schaffler, Ed	207,470.37	3%	6,224.11
Simmons, Charles	32,140.23	45%	14,463.10
Townsend, Ed	42,413.42	5%	2,120.67
Villarreal, Jose	12,576.00	30%	3,772.80
29	2,116,938.40		332,005.36
(Shaded areas are actual time spent at Williamson on this coater)			
Cost Estimate/Interstation "Flexo" EZI Coater & Lift Unit			
for Materials & Overhead only (not including labor) -			44,555.00
TOTAL -			376,560.36

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[illegible]

$71 \cdot 07$
 $55 \cdot 17$
 $45 \cdot 72$
 $227 \cdot 5$
 $112 \cdot 0$
 $915 \cdot 5$
 $492 \cdot 0$
 $4 \cdot 56$
 $32 \cdot 37$
 $3 \cdot 73$
 $6 \cdot 03$
 $49 \cdot 72$
 $52 \cdot 2$
 $59 \cdot 52$
 $9 \cdot 09$
 $1 \cdot 03$
 $180 \cdot 0$
 $1 \cdot 05$
 $12 \cdot 24$
 $170 \cdot 21$
 $60 \cdot 52$
 $525 \cdot 0$
 $1 \cdot 723$
 $84 \cdot 0$
 $45 \cdot 4525$
 $55 \cdot 94$
 $61 \cdot 86$
 $125 \cdot 45$
 $69 \cdot 48$
 $68 \cdot 52$
 $15 \cdot 78$
 $17 \cdot 23$
 $10 \cdot 41$
 $40 \cdot 87$
 $12 \cdot 92$
 $25 \cdot 255 \cdot 7825$

CONFIDENTIAL

PRI 00348

Round to 1,00,000.00

PRI 00349

757.5
 500.0
 60.0
 92.5
 255.5
 455.0
 455.0
 500.0
 920.12
 740.04
 154
 71.07
 50.17
 45.72
 221.5
 112.0
 915.5
 492.0
 455
 42.47
 573
 608
 49.72
 52.2
 59.52
 9.09
 103
 180.0
 103
 12.24
 170.21
 69.52
 52.0
 1528.0
 84.0
 454525
 55.94
 61.86
 125.46
 69.48
 68.52
 15.78
 17.28
 10.41
 40.87
 12.62

PRINTING RESEARCH INC.
INTEROFFICE MEMO

TO: STEVE GARNER
ED SCHAFFLER
FROM: RON RENDLEMAN
DATE: DECEMBER 20, 1995
SUBJ: COST ESTIMATE/INTERSTATION "FLEXO" EZI CTR & LIFT UNIT

I.	MACHINE & RAW MTL:	# OF PARTS	X	PER PART AVG. COST LABOR & MTL	ACT. EST	10K IPH ACT. EST ROUNDED	%	13K IPH OF COST
1.	Ctr. Head	195	x	61.37 \$45.00 ea.	11967 \$ 8,775.	12000 \$ 9,000.	=	23.4
2.	Lift Unit	119	x	\$45.00 ea.	7,303 5,355	7,500 5,500	=	14.3
	TOTAL MACHINING				\$14,130.	\$14,500.	=	37.7
						19,500		20,500

II. PURCH REQUIREMENT:

1.	Hyd. Assy (Ct. head & Lift. Mech.)			3,800.	4,000.	=	10.4	7000
2.	Elec. Assy			3,000.	3,500.	=	9.1	3500
3.	Circ. Assy			7,315.	7,400.	=	19.2	3700
4.	Dr. Blade Assy			1,300.	1,400.	=	3.6	1400
5.	PhotoHE21X Assy			474.	500.	=	1.3	500
6.	Tach Gen. Assy			769.	800.	=	2.1	800
7.	CTG Drum Assy			400.	400.	=	1.0	400
	Sub-Total 1.			\$30,888.	\$32,000.	=	84.4	17300
8.	Anilox Roll Assy			2,200.	2,200.	=	5.7	2200
	Sub-Total 2.			\$33,088.	\$34,200.	=	90.1	1200
9.	Misc. Purch. Items			800.	1,200.	=	3.1	41,200
	Sub-Total 3.			\$33,880.	\$36,400.	=	93.2	1000
10.	Assy & Crate			2,500.	2,000.	=	6.8	42,200
	FINAL TOTALS			\$36,388.	\$38,500.	=	100.0	42,200
	LABOR - ASSEMBLY 60 HRS @ 14			840	41400			42,200
	O/H @ 197% on 84			1655	2495			44,695
	CRATE			700	700			45,395
	EST. TOTAL COSTS =				44,595			45,395

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1995 LIABILITIES & BENEFITS WHICH WERE DEDUCTIBLE
10 (CENTRAL PERSON & COUNCILOR) (NAME)

1. BOB BERENSON = 80%
2. PETE KELLY = 15%
3. DAVID RIZZO = 55%
4. MIKE COCKER = 75% - 2ND COATING UNIT
21781.00 ACTUAL
5. TERRY BEINER = 30%
6. D.J. HENNESSY = 60%
7. LEO DROSHAL = 45%
8. CHARLIE SIMMONS = 45%
9. CADDY LOISPIECH = 20%
10. JOSE VILLAREAL = 30%
11. PAULY BRANSON = 15%
12. STEVE PERSON = 20%
13. HUGH BOB McEAM = 15%
14. MARILYN BUSCH = 75%
15. ED SCHAEFER = 30%
16. STEVE GARNER = 10%
17. WALTER BIRD = 10% **STEVE BAKER 10%**
18. NORMAN DENCORE = 15%
19. ~~STEVE GARNER = 10%~~
20. JOHN BIRD = 15%
21. JOHN AYLER = 6%
22. DAVID DOUGLAS = 15%

LEGAL PATENT COSTS 95

CONFIDENTIAL

PRI 00351

1995 WAGES & BENEFITS WHICH WAS DEVOTED
TO COASTER PROTECT @ WILLIAMSON (TIME)

1. RON KENNEDYMAN = 80%
2. PETE KELLY = 15%
3. DAVID PIZZILLO = 55%
4. MIKE OCKER = 75%
5. TERRY BEITOW = 30%
6. D. J. HENNESSAY = 60%
7. LEON DROSITU = 45%
8. CHARLIE SIMMONS = 45%
9. CARRY LUTSPICH = 20%
10. JOSE VILLARREAL = 30%
11. ANDY BRANSON = 15%
12. STEVE PIERSON = 20%
13. ALB RON MCCRAV = 15%
14. KIMILYN RUBEN = 15%
15. ED. SCHAEFLER = 3%
16. JOHN BIRD = 15%
17. CLAREN BIRD = 10%
18. STEVE BAKER = 10%
19. HOWARD DEMOORE = 15%
20. STEVE GARNER = 10%
21. JOHN AYLER = 6%
22. DAVID DOUGLAS = 15%

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PRI 00352

BRYAN ARGENTI 3%

RICHARD BUTLER - 15%

~~DAN CUNNINGHAM~~

~~JIM ELIOTT~~

KEN HENRY ~~5~~ 5%

KEN MCPHAIL 5%

~~GREG NYER~~ 5%

CHARLIE RAMSEY 5%?

~~CHARLES SIMMONS~~

~~DEAN TOLLEY~~

ED TOWNSEND 5%?

~~BEN VALDEZ~~

~~TIM WILLIAMSON~~

CONFIDENTIAL

CONFIDENTIAL

05/19/99 14:07

PRINTING RESEARCH, INC.

PAGE 1

SORS:1

SALES HISTORY REPORT

BY CUSTOMER ID

SO ID	TYPE	PART	CUSTOMER	PO ID	SLMN	REGION	CO DEPT	ACCOUNT	SHIP TO	CLASS	UM TYP
YEAR	MO	QTY			SALES AMT		COST AMT		GR MARGIN	PCT	

ORDER CLASS: ALL
PRODUCT LINE: ALL

SOLD TO: WIL350 WILLIAMSON PRINTING

TYPE: OY STATUS:

	NS	2-090-0090-01				CABINET, SILENCER				EA	B
1996	4	1			0.00	787.50	0.00		0.00	0.0	
	NS	2-111-0210-01				MANIFOLD, AIR (PRESS, WINDOW)				EA	B
1995	10	4			0.00	75.00	0.00	300.00	0.00	0.0	
	NS	2-116-0040-02				PLENUM BOX				EA	B
1995	10	1			0.00	89.00	0.00		0.00	0.0	
	NS	2-116-0063-01				"Y" BRANCH				EA	B
1995	10	1			0.00	92.00	0.00		0.00	0.0	
	NS	2-211-0040-42				DI WATER TUBE (SINGLE LAMP) 42"				EA	B
1995	10	2			1174.00		0.00		1174.00	100.0	
	NS	2-211-0100-01				STOP, U.V. LAMP HE40				EA	B
1995	10	1			0.00		0.00		0.00	0.0	
	NS	2-215-0052-01				WATER DIST CABINET ASS'Y - 1 LAM				EA	M
1996	2	1			0.00		0.00		0.00	0.0	
	NS	6-009-0001-10				CERAMIC ANILOX ROLL ASSY (100 LI				EA	B
1996	9	1			3300.00		0.00		3300.00	100.0	
	NS	6-009-0001-15				CERAMIC ANILOX ROLL 150L, 12.5VOL				EA	B
1996	9	2			6600.00		0.00		6600.00	100.0	

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SALES HISTORY REPORT

BY CUSTOMER ID

SO ID	TYPE	PART	CUSTOMER	PO ID	SLMN	REGION	CO DEPT	ACCOUNT	SHIP TO	UM TYP	CLASS	
YEAR	MO	QTY	SALES AMT	COST AMT	GR MARGIN	PCT						

ORDER CLASS: ALL

PRODUCT LINE: ALL

SOLD TO: WIL350 WILLIAMSON PRINTING

TYPE: OY STATUS: ^{XS=}

1996	9	2	6600.00	0.00	6600.00	100.0	NS 6-009-0001-20 CERAMIC ANILOX ROLL ASS'Y (200 L EA B 2345.00 4,690.00					
1996	9	2	6600.00	0.00	6600.00	100.0	NS 6-009-0001-30 CERAMIC ANILOX ROLL ASS'Y (300 L EA B 2445.00 5,890					
1996	9	1	75000.00	0.00	75000.00	100.0	NS 6-100-0002-02 LM/HRCLR, ANILOX CTR HEAD HEIDELB EA B 6600.00 11,200.00 ✓ 0.00					
1996	9	1	0.00	0.00	0.00	0.0	NS 6-100-0003-01 L/M CARRIAGE ASSY ANILOX CTR EA B 7,500.00 ✓ 0.00					
1996	9	1	0.00	0.00	0.00	0.0	NS 6-300-0002-01 CONTROL STATION HRC CTR EA M 920.12					
1996	9	1	0.00	0.00	0.00	0.0	NS 6-300-0003-01 LIFT CONTROL HRC EA M 74204					
1995	6	1	338.00	0.00	338.00	100.0	NS 8-424-0004-04 LAMP UV 42" H13K/42AM/5C 300 W/I EA B					
1995	10	2	676.00	0.00	676.00	100.0						
1995	3	1	0.00	0.00	0.00	0.0	NS 8-501-0002-14 PANEL, 4.88 X 2.88 HOFFMAN #A-6P EA B 1.34					
1995	3	1	0.00	0.00	0.00	0.0	NS 8-505-0002-08 KIT, REMOTE CONTROL SQ D#VM3A1610 EA B 91.07					

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SALES HISTORY REPORT

BY CUSTOMER ID

SO	TYPE	PART	CUSTOMER	PO ID	SLMN	REGION	CO DEPT	ACCOUNT	SHIP TO	CLASS	UM TYP
YEAR	MO	QTY	SALES AMT	COST AMT	GR MARGIN	PCT					

ORDER CLASS: ALL

PRODUCT LINE: ALL

SOLD TO: WIL350 WILLIAMSON PRINTING

TYPE: OY STATUS:

	NS	8-510-0008-03									
1995	3	1	0.00	0.00	0.00	0.0					
	NS	8-540-0001-03									
1995	2	1	0.00	0.00	0.00	0.0					
	NS	8-700-0002-03									
1995	10	50	0.00	0.00	0.00	0.0					
	NS	8-700-0002-04									
1996	5	25	0.00	0.00	0.00	0.0					
	NS	8-700-0002-06									
1996	5	150	0.00	0.00	0.00	0.0					
	NS	8-700-0002-65									
1995	10	50	0.00	0.00	0.00	0.0					
1996	5	25	0.00	0.00	0.00	0.0					
	NS	8-750-0001-04									
1996	5	6	0.00	0.00	0.00	0.0					
	NS	8-750-0001-07									
1995	10	16	0.00	0.00	0.00	0.0					
1996	5	15	0.00	0.00	0.00	0.0					
	NS	8-750-0001-08									
1996	5	2	0.00	0.00	0.00	0.0					

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SALES HISTORY REPORT

BY CUSTOMER ID

SO	TYPE	PART	DESCRIPTION				UM	TYP
YEAR	MO	QTY	CUSTOMER PO ID	SLMN	REGION	CO DEPT ACCOUNT	SHIP TO	CLASS
				SALES AMT		COST AMT	GR MARGIN	PCT

ORIG CLASS: ALL

PRC CT LINE: ALL

SOLD TO: WIL350 WILLIAMSON PRINTING

TYPE: OY STATUS:

NS 8-750-0001-13

HOSE-CLAMP #HS48 2 9/16"-3 1/2" EA B

-76

6.08

1995	10	8		0.00		0.00	0.00	0.0
------	----	---	--	------	--	------	------	-----

NS 8-800-0001-03

FAN, SQ, AXIAL, 115VAC COMAIR MODEL EA B

24.86

49.72

1996	5	2		149.00		0.00	149.00	100.0
------	---	---	--	--------	--	------	--------	-------

NS 8-817-0001-64

QUICK DSCN BODY BRS 1/2FPT SWGLK EA B

26.10

52.20

1996	1	2		164.00		0.00	164.00	100.0
------	---	---	--	--------	--	------	--------	-------

NS 8-817-0001-65

QUICK DSCN STEM BRS 1/2 HX 1/2FPT EA B

19.76

39.52

1996	1	2		119.00		0.00	119.00	100.0
------	---	---	--	--------	--	------	--------	-------

NS 8-853-0004-03

SHEET METAL 4" X 3" REDUCER #420 EA B

303

9.09

1996	5	3		0.00		0.00	0.00	0.0
------	---	---	--	------	--	------	------	-----

NS NON STOCK

NOT ON PARTS MASTER FILE

S

1995	11	5		0.00		0.00	0.00	0.0
------	----	---	--	------	--	------	------	-----

1995	12	1		0.00		0.00	0.00	0.0
------	----	---	--	------	--	------	------	-----

1996	2	1		47606.00		0.00	47606.00	100.0
------	---	---	--	----------	--	------	----------	-------

1996	4	3		9600.00		0.00	9600.00	100.0
------	---	---	--	---------	--	------	---------	-------

1996	5	0		3600.00		0.00	3600.00	100.0
------	---	---	--	---------	--	------	---------	-------

NS XB2SBNET00

ORIGINAL GENERIC B2 NET 47.0" X EA B

S

1995	6	36		756.00		0.00	756.00	100.0
------	---	----	--	--------	--	------	--------	-------

NS XF1SBNET00

ORIGINAL GENERIC F1 NET 43.0" X EA B

S

1995	6	72		1512.00		0.00	1512.00	100.0
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SALES HISTORY REPORT

BY CUSTOMER ID

SO ID	TYPE	PART	CUSTOMER	PO ID	SLMN	DESCRIPTION	REGION	CO DEPT	ACCOUNT	SHIP TO	UM TYP
YEAR	MO	QTY	SALES AMT			COST AMT		GR MARGIN		CLASS	PCT

ORDER CLASS: ALL
PRODUCT LINE: ALL

SOLD TO: WIL350 WILLIAMSON PRINTING

TYPE: OY STATUS:

	NS	XTRVLCOATR				T & I - COATER/DRYER SYSTEM INST	EA	B			
											C
1995	11	2	0.00			0.00		0.00		0.0	
1996	2	1	4000.00			0.00		4000.00		100.0	
081568	NS	2-120-0029-01 B DAVIS	990			OPRATOR CNTRL STATION VENTAHOOD	EA	M			
						00 00 415000 WIL350					
1996	10	1	2510.00			0.00		2510.00		100.0	
081568	NS	2-120-0030-02 B DAVIS	990			AC DRIVE CABINET VENT HOOD FAN C	EA	M			
						00 00 415000 WIL350					
1996	10	1	0.00			0.00		0.00		0.0	
081568	NS	8-550-0002-05 B DAVIS	990			LOCKNUT, PLASTIC, 1/2" #8463	EA	B			
						00 00 415000 WIL350					
1996	10	2	0.00			0.60		-0.60		999.9	
081568	NS	8-550-2000-00 B DAVIS	990			TUBING, FLEX, PLAS, 1/2" HEYCO 8451 FT	EA	B			
						00 00 415000 WIL350					
1996	10	3	0.00			1.83		-1.83		999.9	
081568	NS	8-560-0001-15 B DAVIS	990			TERM RING, NON-INSUL#10 16-14G#83	EA	B			
						00 00 415000 WIL350					
1996	10	1	0.00			0.07		-0.07		999.9	
081568	NS	8-561-0001-34 B DAVIS	990			LABEL"480VOLTS".5X2.25 #PVC480C	EA	B			
						00 00 415000 WIL350					
1996	10	1	0.00			0.07		-0.07		999.9	
081568	NS	8-570-0004-07 B DAVIS	990			JOINT, WIRE, INSUL'ED PANDUIT#JN41	EA	B			
						00 00 415000 WIL350					
1996	10	6	0.00			1.20		-1.20		999.9	
081568	NS	8-590-1300-14 B DAVIS	990			WIRE, 14G UL TYPE 1015 (BLACK) 87 FT	EA	B			
						00 00 415000 WIL350					
1996	10	12	0.00			0.84		-0.84		999.9	

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SALES HISTORY REPORT

BY CUSTOMER ID

SO	TYPE	PART	CUSTOMER	PO ID	SLMN	REGION	CO DEPT	ACCOUNT	SHIP TO	UM TYP
YEAR	MO	QTY	SALES AMT	COST AMT	GR MARGIN	CLASS	PCT			

ORDER CLASS: ALL

PRODUCT LINE: ALL

SOLD TO: WIL350 WILLIAMSON PRINTING

TYPE: OY STATUS:

081568	NS	8-590-1305-14 B DAVIS	990	00 00	415000	WIL350				
1996	10	3	0.00	0.21	-0.21	999.9				
0868 9	NS	XF1SBNET00 010585	SB	00 00	413000	WIL350				
1996	12	60	1260.00	133.20	1126.80	89.4				
090382	NS	8-DRB-LD10-03 PARTS	990	00 90	419700	WIL350				
1997	4	1	308.55	1.03	307.52	99.7				
093454	NS	2-211-0209-42 013488	990	00 90	419700	WIL350				
1997	8	2	642.00	214.00	428.00	66.7				
093464	NS	8-424-0004-08 013488	990	00 90	419700	WIL350				
1997	8	2	786.00	262.00	524.00	66.7				
093407	NS	X0S0425320 J BROWNLEE	990	00 00	413000	WIL350				
1997	8	12	0.00	0.00	0.00	0.0				
094798	NS	6-064-0006-02 14117	990	00 90	419700	WIL350				
1997	9	6	216.00	0.00	216.00	100.0				
094798	NS	8-DRB-LD75-03 14117	990	00 90	419700	WIL350				
1997	9	1	308.70	1.03	307.67	99.7				
094798	NS	XDRBBFSL24 14117	990	00 90	419700	WIL350				
1997	9	1	38.30	12.24	26.06	68.0				

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SORF 1

SALES HISTORY REPORT

BY CUSTOMER ID

SO ID	TYPE	PART	CUSTOMER PO ID	SLMN	REGION	CO DEPT	ACCOUNT	SHIP TO	CLASS
YEAR	MO	QTY	SALES AMT	COST AMT	GR MARGIN	PCT			

ORDER CLASS: ALL
PRODUCT LINE: ALL

SOLD TO: WIL350 WILLIAMSON PRINTING

TYPE: OY STATUS:

094877	NS	8-403-0001-02 PARTS	990	00 90	419700	WIL350	EA B	C
1997	9	1	510.63	170.21		340.42	66.7	
095016	NS	8-505-0002-01 14183	990	00 90	419700	WIL350	EA B	C
1997	10	1	1242.00	60.52		1181.48	95.1	
095116	NS	8-424-0004-08 14247	990	00 90	419700	WIL350	EA B	C
1997	10	2	786.00	262.00	524.00	524.00	66.7	
096910	NS	8-424-0004-04 PARTS	990	00 90	419700	WIL350	EA B	C
1997	12	1	345.00	115.00		230.00	66.7	
096920	NS	8-424-0004-08 PARTS	990	00 90	419700	WIL350	EA B	C
1997	12	2	786.00	262.00		524.00	66.7	
097408	NS	6-064-0006-01 14966	990	00 90	419700	WIL350	EA B	C
1997	12	12	336.00	144.00	1728.00	192.00	57.1	
097408	NS	8-570-0004-06 14966	990	00 90	419700	WIL350	EA B	C
1997	12	24	59.76	20.02		39.74	66.5	
097408	NS	8-590-0001-39 14966	990	00 90	419700	WIL350	EA B	C
1997	12	4	10.32	3.44		6.88	66.7	
097408	NS	8-616-0006-75 14966	990	00 90	419700	WIL350	EA B	C
1997	12	50	367.50	122.50		245.00	66.7	

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SALES HISTORY REPORT

BY CUSTOMER ID

SO	TYPE	PART	CUSTOMER	PO ID	SLMN	REGION	CO DEPT	ACCOUNT	SHIP TO	UM TYP
YEAR	MO	QTY	SALES AMT	COST AMT	GR MARGIN	PCT				

ORDER CLASS: ALL
 PRODUCT LINE: ALL

SOLD TO: WIL350 WILLIAMSON PRINTING TYPE: OY STATUS:

098499	RA	8-505-0002-06 TBA	990	DRIVE, AC-MOTOR, 1HP/ 460V; SQ D#AT	EA B
				00 90 439700 WIL350	C
1998	1	-1	-1242.00	-414.00	-828.00 66.7
098492	NS	6-030-0001-02 15392	990	GEAR, ANILOX ROLL BOLTD 30 T RH &	EA B
				00 90 419700 WIL350	C
1998	2	1	252.00	84.00	168.00 66.7
100399	NS	X0S0425320 017121	DA	PRECISION STRIPE NET 42.5" X 32.	EA M
				00 00 413000 WIL350	S
1998	7	96	2208.00	255.36	1952.64 88.4
107357	NS	6-019-0015-02 18546	990	TIE BAR LWR HEAD & LIFT UNIT HRC	EA B
				00 90 419700 WIL350	C
1998	11	1	60.00	15.4525	0.00 60.00 100.0
107357	NS	6-039-0062-01 18546	990	TRIP-ARM, NIP GUARD HRCLR	EA B
				00 90 419700 WIL350	C
1998	11	1	78.32	55.94	22.38 28.6
107357	NS	6-039-0063-01 18546	990	CLAMP-WIRE HOLDDOWN HRC CTR -HE	EA B
				00 90 419700 WIL350	C
1998	11	1	86.60	61.86	24.74 28.6
107357	NS	6-039-0064-01 18546	990	CABLE GUARD & PASSAGE WAY HRC CT	EA B
				00 90 419700 WIL350	C
1998	11	1	172.84	123.46	49.38 28.6
107357	NS	6-039-0069-01 18546	990	H.V. GUARD MOD HRC CTR COLOR UNI	EA B
				00 90 419700 WIL350	C
1998	11	1	97.27	69.48	27.79 28.6
107357	NS	6-039-0069-02 18546	990	H.V. GUARD MOD HRC CTR COLOR UNI	EA B
				00 90 419700 WIL350	C
1998	11	1	95.93	68.52	27.41 28.6

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United States Patent [19]

DeMoore

[11] 4,402,267

[45] Sep. 6, 1983

[54] METHOD AND APPARATUS FOR HANDLING PRINTED SHEET MATERIAL

[75] Inventor: Howard W. DeMoore, Dallas, Tex.

[73] Assignee: Printing Research Corporation, Dallas, Tex.

[21] Appl. No.: 242,715

[22] Filed: Mar. 11, 1981

[51] Int. Cl.³ B41F 21/00

[52] U.S. Cl. 101/419; 101/422;
101/426; 118/DIG. 15

[58] Field of Search 101/42.2, 416 R, 417,
101/418, 419, 426; 29/120, 130, 131, 121.3;
118/DIG. 15

[56] References Cited

U.S. PATENT DOCUMENTS

1,231,141	6/1917	Ellis	101/422 X
1,231,142	6/1917	Ellis	101/422 X
1,933,161	10/1933	Claybourn et al.	101/422
2,878,742	3/1959	Trump	101/422 UX
3,750,571	8/1973	Germann	101/415.1
3,791,644	2/1974	DeMoore	
3,892,179	7/1975	Jahn	101/415.1
3,910,186	10/1975	D'Amato et al.	29/131

OTHER PUBLICATIONS

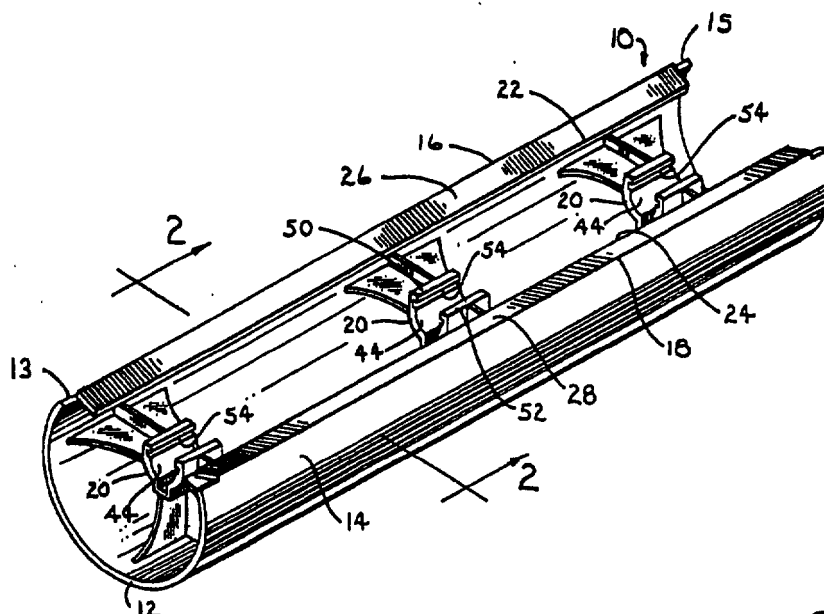
Seitzinger, R. C., "Coatings That Cut Friction", *Machine Design*, Oct. 21, 1976.

Primary Examiner—Edgar S. Burr
Assistant Examiner—Moshe I. Cohen
Attorney, Agent, or Firm—Fulwider, Patton, Rieber, Lee & Utecht

[57] ABSTRACT

A skeleton wheel or cylinder for supporting freshly printed sheet material between printing stations or at the delivery station of a printing press is provided with a loosely retained ink repellent fabric covering for supporting and conveying the sheet material without transfer of wet ink from one sheet to a successive sheet and without smearing the ink or indenting the surface of the sheet material. The circumferential surface of the skeleton cylinder is provided with a coating of a fluorocarbon plastic having a fabric base portion bonded to the surface of the cylinder structure. The low friction properties of the coating permit ease of shuffling movement of the fabric covering and the coating structure provides a cushioning effect to prevent smearing or indenting the sheet material by the fabric cover. The improved cylinder is provided with a plurality of retaining plates slidably fitted in axially spaced hub portions of the cylinder which plates are each locked in place by a set screw. The rim portion of the cylinder includes opposed parallel flanges on which the opposite ends of the fabric covering may be removably retained.

25 Claims, 4 Drawing Figures



Δ π EXHIBIT 18	
Deponent	DeMoore
Date	10/17/00
Rptr	2
WWW.DEPOBOOK.COM	

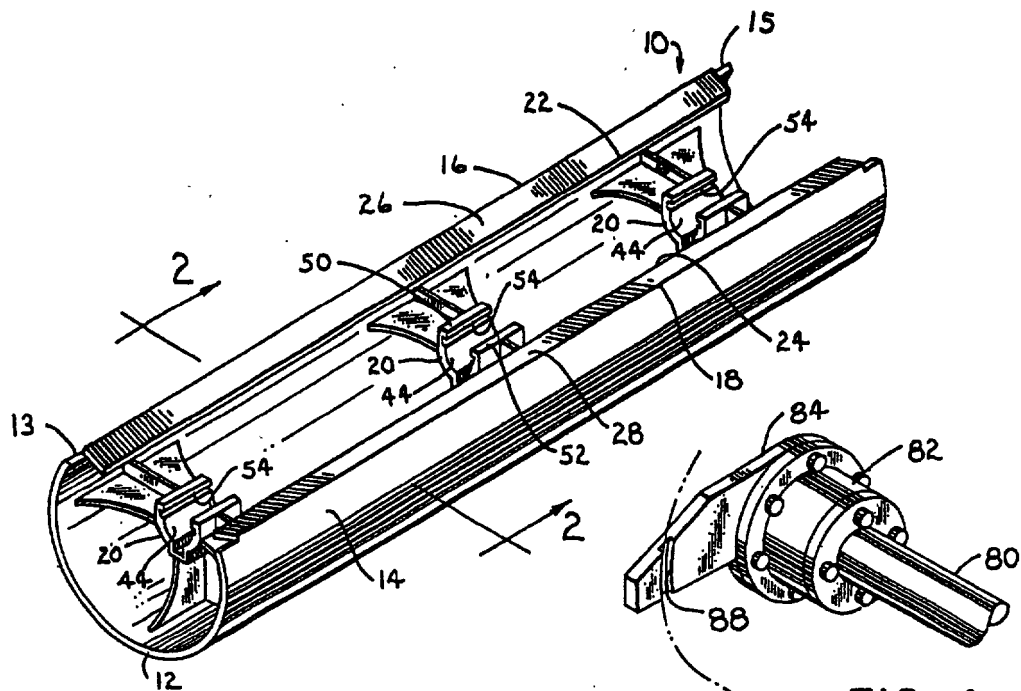


FIG. 1

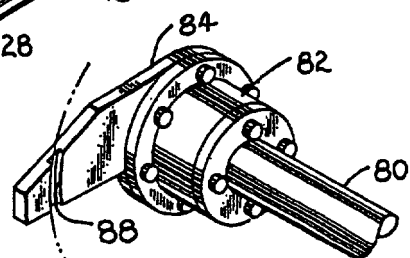


FIG. 4

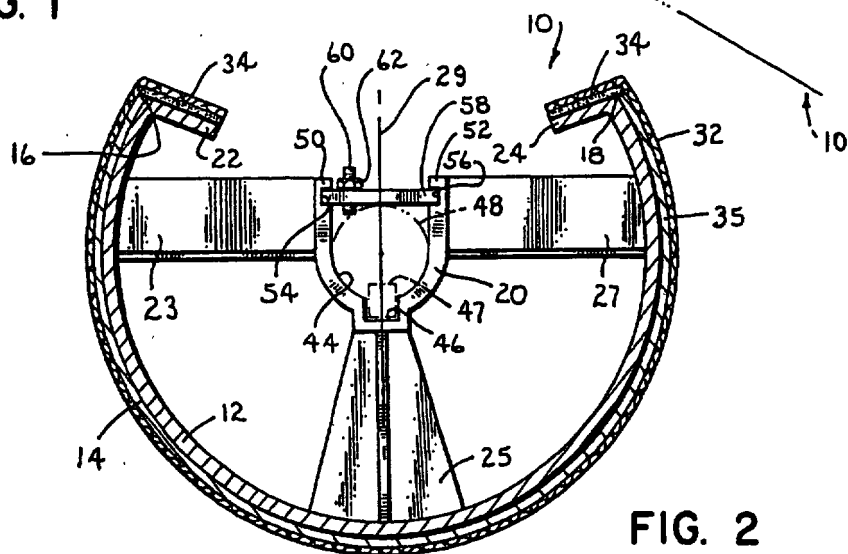


FIG. 2

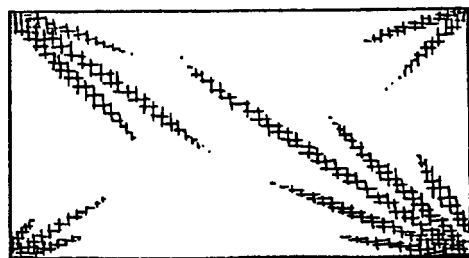


FIG. 3

FIG. 1

METHOD AND APPARATUS FOR HANDLING PRINTED SHEET MATERIAL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention pertains to a method and apparatus for providing improved support for freshly inked sheet material in a printing press or the like.

2. Background Art

It has been traditional in the art of printing press apparatus and the like to provide devices for supporting freshly inked sheet material when transferring the material from one printing station to another or when handling the sheets as they are delivered from the press wherein said devices comprise wheels of relatively narrow width and characterized by having circumferentially spaced teeth. Such devices are known by the term skeleton wheels in the printing press art. The problems inherent in handling freshly inked printed sheets and the like by skeleton wheels have been longstanding. In order to minimize the contact area between the skeleton wheels and the printed sheet traditional thinking led to the provision of wheels in the form of relatively thin disks having a toothed or serrated circumference. However, these types of wheels have not overcome the problems of smearing and marring the inked surface of the sheet material due to sliding action between the material and the projections or serrations. Moreover, the attempts to minimize the surface area in contact with the sheet material has also resulted in actual indenting or dimpling of the material itself.

Various efforts have been made to overcome the disadvantages of thin disk skeleton wheels. One of the more successful approaches has been completely contrary to the concept of minimizing the surface area. This more recent development is disclosed and claimed in my U.S. Pat. No. 3,791,644 wherein I provide for a substantially cylindrical drum or roller coated with an improved ink repellent surface comprising a layer of polytetrafluoroethylene. Although this improved skeleton wheel has been commercially successful, with continuous use such as is common in many commercial printing operations, there is over a period of time a slight accumulation of ink on the surface of the wheel.

In high speed commercial printing equipment, for example, it has been determined that in order to provide satisfactory printing quality the surface of the coated wheel must be washed relatively frequently with a solvent to remove any ink accumulation. Moreover, it has also been determined that the TFE coated wheels do not provide a cushioning effect which is important for the tightly stretched sheet material as it engages and is supported by the skeleton wheel.

In accordance with the present invention the problems with the prior art thin disk and other type skeleton wheel concepts have been overcome with a skeleton wheel of relatively great width and with an improved ink repellent and supportive structure which may be used in conjunction with the teaching of U.S. Pat. No. 3,791,644 as well as further improvements which I have made in support and handling apparatus for handling freshly inked sheet material.

SUMMARY OF THE INVENTION

The present invention provides an improved method for handling sheet material which has been freshly inked or printed on at least one side wherein the sheet

material is supported by a cylindrical roller or skeleton wheel which has mounted on a cylindrical surface thereof a relatively loose woven fabric or the like. In accordance with one aspect of the present invention there is provided a method for handling freshly printed sheet material in a printing press delivery apparatus or the like wherein a cylindrical roller or skeleton wheel has mounted on the support surface of the wheel a woven fabric of cotton or the like and which is relatively loosely supported on the support surface of the wheel. In accordance with another aspect of the present invention there is provided a method of supporting freshly printed sheet material or the like by means of a cylindrical skeleton wheel or roller having a support surface for a relatively lightweight fabric which is provided by a liquid repellent material of low friction characteristics such as one of the fluoroplastics or the like.

In accordance with another aspect of the present invention there is provided an improved skeleton wheel or roller for a printing press which includes a fabric covered supporting surface for engaging freshly printed sheet material or the like. In a preferred embodiment of the present invention the fabric covering for the skeleton wheel or roller comprises a lightweight cotton fabric or the like treated with a suitable liquid repellent. The fabric is relatively loosely supported on the surface of the cylinder or wheel to accommodate any slight relative movement between the sheet material and the skeleton wheel without marring the freshly inked surface or damaging the sheet material itself. The improved support roller or skeleton wheel of the present invention also contemplates a supporting surface for the fabric covering which may include a low friction fluoropolymer layer.

In accordance with another aspect of the improved skeleton wheel of the present invention the cylindrical support surface for the fabric covering may comprise a coated or impregnated fabric bonded to the cylindrical wheel surface and forming a supporting surface for the loosely secured fabric covering which is directly engageable with the sheet material.

The present invention provides a substantially improved yet simple and reliable handling apparatus and method in the form of a skeleton wheel for printing equipment and the like which is adapted to support sheet material including freshly inked surfaces thereof, without smearing or marking the printed surface and without damaging the sheet material itself. The improved fabric covered skeleton wheel of the present invention is easily installed on a printing press and the fabric covering is easily removed for cleaning or replacement as needed. Those skilled in the art will recognize these advantages as well as other superior features of the present invention upon reading the detailed description which follows in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the improved skeleton wheel of the present invention before application of the coating and fabric covering.

FIG. 2 is a detail section view taken along the line 2—2 of FIG. 1 showing the layers of materials covering the circumferential surface of the wheel;

FIG. 3 is a plan view of a piece of fabric covering adapted for mounting on the skeleton wheel of the present invention; and

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1 of the drawings there is illustrated an elongated member or skeleton wheel generally designated by the numeral 10 comprising the improved skeleton wheel or roller in accordance with the present invention. The skeleton wheel 10 is characterized by a partial cylindrical rim portion 12 which is adapted to be mounted on a press adjacent apparatus, not shown, such as delivery grippers or the like. Accordingly, the outer cylindrical surface 14 of the rim portion 12 has an opening extending the axial width of the skeleton wheel defined by leading and trailing edges 16 and 18, respectively. The skeleton wheel 12 includes a plurality of spaced apart hub portions 20 which may be integrally formed with the rim 12 to comprise a one piece integral casting of aluminum, for example. The hub portions 20 are connected to the rim portion 12 by webs 23, 25 and 27 and are adapted to provide for supporting the skeleton wheel rigidly secured for rotation on a shaft on a printing press in a manner similar to the mounting arrangement disclosed in U.S. Pat. No. 3,791,644 or by an improved arrangement to be discussed herein. As shown in FIG. 1, the skeleton wheel 10 includes opposed elongated integral flange portions 22 and 24 which extend generally inwardly from the surface 14 of the rim 12. The flange portions 22 and 24 include elongated flat surfaces 26 and 28 provided for a purpose to be described further herein.

ink from a previous sheet to a successive sheet and without marring or depressing the surface of the paper. In accordance with the present invention it has been determined that a woven fabric, preferably cotton, of a relatively loose weave on the order of what is commonly known as gauze has produced the unexpected improvement in a method and apparatus for handling printed material that has wet ink on the surface thereof as it passes over and is supported by the skeleton cylinder. A suitable fabric in accordance with the present invention and illustrated in the embodiment of FIG. 3 comprises a loosely woven, lightweight cotton material such as gauze. A cloth having a forty count or forty mesh, such as the piece of fabric 32 illustrated in FIGS. 2 and 3, treated in accordance with the present invention and attached to the surfaces of the flanges 22 and 24 in a suitable manner has produced the unexpected improvement in the handling of printed sheet material in printing presses and the like. The piece of fabric 32 is preferably of rectangular shape dimensioned to completely cover the outer cylindrical surface of the rim 12.

A preferred method of preparing the fabric piece 32 in accordance with the present invention involves washing the fabric in water in the presence of a suitable fabric softener dissolved therein in rather liberal quantities. One suitable fabric softener which has been used in preparation of the fabric piece 32 is manufactured under the trademark "DOWNY" and, in the washing process, two to three times the normal recommended quantity of softener has been used for washing the fabric in plain water. After washing the fabric piece 32 and allowing same to dry a suitable fabric protector is applied to enhance the liquid repellancy characteristics of the material. A preferred type of fabric protector is manufactured under the trademark SCOTCHGARD by the 3M Manufacturing Company, Minneapolis, Minn. as their Part No. FCA4101-C-12. Moreover, it has been determined that even though some ink will accumulate on the surface of the fabric threads over an extended period of operating time the provision of the fabric protector permits the occasional rubbing or agitation of the fabric by the press operator in place on the skeleton cylinder to break loose and remove dried ink particles or crystals which have accumulated on the fabric without requiring removal and washing of the fabric piece.

Referring to FIG. 2 a suitable method of attaching the fabric piece 32 to the outer surface of the rim 12 is by a double sided adhesive tape strip 32 disposed on and extending the length of each of the respective surfaces 26 and 28. Another suitable method of attaching the fabric piece 32 would be by the use of fastener strips such as of the type made under the trademark VELCRO. Those skilled in the art will appreciate that other means may be provided for attaching the fabric piece 32 to the flanges 22 and 24, however, the abovementioned methods provide for quickly attaching and removing the fabric piece 32 with respect to the wheel 10.

An important aspect of the present invention concerns the type of fabric support surface provided on the rim 12 and overlying the surface 14. The improved surface is preferably of a low coefficient of friction such as may be provided by coating the metal surface 14 of the cylinder with a fluoroplastic as taught by U.S. Pat. No. 3,791,644. Although the combination of the coating described in the abovementioned patent together with the fabric member 32 attached thereover provides suitable performance it has been discovered that the fabric covering for the skeleton wheel 10 per-

forms somewhat better in eliminating any marring or depressions in the surface of the sheet material by the application of a coating including a fabric reinforcement as will be described herein.

Referring to FIG. 2 the rim portion 12 of the skeleton wheel 10 is provided with a coating 35 comprising a fluorocarbon composite coating material applied in one or more coats over a fabric base which is adhesively bonded to the cylindrical circumferential 14 of the rim portion 12. It is believed that the provision of the fabric base for the coating such as described herein provides a cushioning effect for the fabric piece 32 which is applied over the coating 35 and which reduces the tendency for the fabric piece 32 to indent or form depressions in the surface of the sheet material as well as substantially preventing the transfer of wet ink from one sheet to a successive sheet.

In a preferred method of preparing and forming the coating 35 a suitable piece of fabric such as cotton canvas of approximately 0.022 inch nominal thickness and having a waterproofing applied to one side thereof is cut somewhat oversize, approximately 4 to 5 inches all around, from the actual size required to cover the entire surface 14. The fabric is then suitably tacked to a substantially flat and smooth preparation surface to prevent movement or shrinkage while a first coat of the fluoropolymer or fluorocarbon material is applied thereto. A preferred composition for providing the coating 35 is a liquid fluoropolymer coating made under the trademark XYLAN by the Whitford Corporation, Westchester, Pa. A satisfactory coating material of the type referred to hereinabove is XYLAN 1010 composite type coating material which is self curing at room temperature.

After the aforescribed fabric base is temporarily fastened to a suitable surface with the waterproof side facing said surface the non waterproofed side of the fabric is sanded lightly with a 220 grit paper to bring out the nap of the fabric. One coat of XYLAN 1010 coating material is then applied to the aforescribed fabric and allowed to cure at room temperature. Once the first coating layer has been allowed to dry the coated fabric is removed from the temporary preparation surface and bonded to the surface 14 of the rim 12 using a suitable adhesive such as a contact cement made by 3M Corporation. The surface of the coated fabric piece which is applied to the surface of the rim portion 12 is the waterproofed side. The surface 14 is normally prepared for application of the adhesive in the prescribed manner to be clean and dry. Care should be taken to roll out the coated fabric piece of the coating 35 when it is applied to the surface 14 to prevent entrapment of air bubbles or the like.

After the adhesive is allowed to dry the fabric is trimmed to size and additional coatings of the fluoropolymer are applied and allowed to dry between coats. A suitable coating 35 is formed by the application of three additional layers of XYLAN 1010 coating material after the fabric base has been bonded to the surface of the rim 12. The surface formed by the coating 35 is preferably sanded lightly between each coat of fluoropolymer with, for example, 400 grit finishing paper.

The preparation of the surface coating 35 as aforescribed provides a substantially glazed surface with a low coefficient of friction which is ink repellent and also provides for ease of movement of the fabric piece 32 when the same is attached to the cylinder 10. Although, in accordance with the present invention, the fluoropolymer coating described is particularly advan-

teagueous it is contemplated that other low friction plastic coatings may be applied to the aforementioned fabric base to produce a suitable surface for the fabric member 32. The particular fluorocarbon type coating of the general class of coatings referred to herein has produced the unexpected improvement of reducing ink transfer of one sheet to another in high speed printing equipment and has also, in combination with the fabric member 32, reduced depressing or indenting of the paper surface of the sheets. After the coating 35 has been prepared the fabric piece 32 is applied to the flanges 22 and 24 by the adhesive stripes 34 or other suitable fastening means loose enough so that with normal finger pressure the fabric may be locally moved over the surface of the coating 35 in all directions at least one eighth inch to one inch. Moreover, in printing presses in which the drive train has become loose with wear, for example, relative movement between the press impression cylinder and the skeleton wheel will not result in smearing of the ink thanks to the movability of the fabric covering with respect to the cylinder rim.

The improved skeleton wheel or cylinder of the present invention also includes improved means for attaching the wheel to the associated driving shaft of the printing press. Referring to FIGS. 1 and 2, the spaced apart hub portions 20 are provided with semi-cylindrical support surfaces 44 which are intersected by a suitable keyway 46 in which may be disposed a key 47 for drivingly engaging the skeleton wheel 12 with a press drive shaft indicated by the numeral 48 in FIG. 2. The hub portions 20 are provided with an improved retention means for mounting the skeleton wheel 10 on the shaft 48. The spaced apart hub portions 20 are each formed with integral axially extending bosses 50 and 52 spaced apart sufficiently to allow the skeleton wheel to be slipped radially on and off of the shaft 48. The bosses 50 and 52 are provided with opposed axially extending slots 54 and 56, respectively, which are aligned with each other to permit the insertion of a retaining plate 58. The retaining plate 58 is preferably of a length slightly less than the span between the bottoms of the grooves 54 and 56 so that the plate fits snugly in the respective grooves. The plate is preferably of a width equal to the axial length of the bosses 50 and 52. As shown in FIG. 2, the retaining plate 58 is provided with a socket head lock screw 60 threadedly engaged with the retaining plate and provided with a suitable lock nut 62. The lock screw 60 is offset from the center line which bisects the opening between the spaced apart bosses 50 and 52.

The lock screws 60 are adapted to be tightened to engage the periphery of the shaft 48 to prevent axial sliding of the skeleton wheel 10 with respect to the shaft and to permit minor radial adjustment of the skeleton wheel with respect to the shaft. When installing the cylinder 10 on the shaft 48 or removing the cylinder from the shaft the improved retaining plate 58 may be inserted in and removed from the respective grooves 54 and 56 followed by tightening or loosening of the screws 60, as the case may be, to provide a simplified arrangement for mounting and removing the cylinder with respect to the associated press drive shaft. The leading and trailing edges 16 and 18 are advantageously disposed substantially equidistant from the centerline 29 so that in some applications the skeleton wheel 10 can be turned end for end when the leading edge becomes worn or damaged.

Another feature of the present invention which has permitted improved retrofitting of a skeleton wheel such as the wheel 10 on certain types of press equipment is provided by the axially extending portions 13 and 15 of the rim 12 which extend in opposite directions respectively from the flanges 22 and 24. In certain types of presses such as a model TP-38A made by the Miller Printing Equipment Company one or more stationary side plates are located adjacent ends of the skeleton wheel or cylinder and are positioned such that certain lengths of printed material will overlap the side plates and will be disfigured while being conveyed past the plates under the support of the skeleton wheel because the wheel cannot be moved axially on the shaft to the non printed area of the sheet. However, with the improved skeleton cylinder 10 having the axially extending rim portions 13 and 15, a suitable annular groove may be cut in the side plates to accommodate the axial length of the wheel 10 to thereby substantially support the full length of the sheet material as it is conveyed by the wheel.

Referring to FIG. 4 there is shown a detail view of a portion of a skeleton wheel support shaft 80 similar to the shaft 48. The shaft 80 is supported in a bearing assembly 82 which is bolted to a support assembly including a side plate member 84. The plate 84 is stationary and prevents the use of a skeleton wheel or cylinder having a length substantially equal to the length of the sheet and providing adequate support thereof. However, by forming the annular groove 88 to have radial and axial dimensions with respect to the longitudinal centerline of the shaft 80 sufficient to clear the axial end portions 13 or 15 of the rim 12, the cylinder 10 may be installed on a press equipped as shown to support substantially the entire length of the sheet material.

Those skilled in the art will appreciate that various modifications to the method and apparatus of the present invention may be made without departing from the scope of the invention as defined in the appended claims.

What I claim is:

1. A method for supporting and conveying sheet material which has been freshly printed and discharged from a printing press or the like without marring the freshly inked surface, comprising the steps of:
 - providing a skeleton wheel having a sheet supporting surface thereon;
 - providing a piece of fabric;
 - attaching said piece of fabric to said skeleton wheel to be disposed over at least that part of said surface which supports said sheet material, said piece of fabric being attached relatively loosely to permit and accommodate slight movement between the fabric and the skeleton wheel when the sheet material is supported and conveyed by skeleton wheel and
 - rotating said skeleton wheel to engage successive sheets of said sheet material in supportive and conveying relationship thereto by said piece of fabric without marring said freshly printed surface.
2. The method as set forth in claim 1 together with the steps of:
 - providing said piece of fabric of woven cloth.
3. The method set forth in claim 2 wherein:
 - said cloth is provided of woven substantially gauze-like cotton material on the order of about forty mesh.

4. The method set forth in claim 1 or 3 together with the steps of:
 - treating said fabric with a liquid repellent prior to attaching said piece of fabric to said skeleton wheel.

5. The method set forth in claim 4 together with the steps of treating said fabric with a fabric softening material prior to treating said fabric with liquid repellent.

6. The method set forth in claim 1 together with the steps of:
 - providing an ink repellent coating on said surface for supporting said piece of fabric.

7. The method set forth in claim 6 wherein:

said coating includes a polytetrafluoroethylene.

8. The method set forth in claim 6 together with the step of:
 - providing a fabric base portion for said coating.

9. In a skeleton wheel for supporting and transferring a freshly printed sheet from a printing station on a printing press or the like without marring the freshly inked surface;

a generally cylindrical rim segment having a generally cylindrical support surface formed thereon; and

a fabric covering disposed over at least a part of said support surface for supportively engaging one side of said sheet during the transfer thereof; and

means for securing said fabric covering to extend relatively loosely over said support surface to permit and accommodate slight movement between the fabric covering and said support surface when the printed sheet is supported and transferred by the skeleton wheel so that the freshly printed sheet is not marred.

10. The invention set forth in claim 9 wherein:

said fabric covering comprises woven substantially gauze-like cotton material on the order of about forty mesh.

11. The invention set forth in claim 10 wherein:

said fabric covering is treated with a liquid repellent.

12. The invention set forth in claim 10 wherein said

fabric covering is treated with a fabric softening agent.

13. The invention set forth in claim 9 wherein:

said generally cylindrical support surface is delimited in a circumferential direction by opposed elongated flanges, and said skeleton wheel includes means for removably attaching said fabric covering to said wheel along said flanges.

14. The invention set forth in claim 13 wherein:

said means for attaching includes an adhesive strip mounted on said flanges.

15. The invention set forth in claim 13 wherein:

said rim segment extends axially beyond said flanges for supporting substantially the entire length of said sheet.

16. The invention set forth in claim 9 or 13 wherein:

said surface includes a low friction coating thereon.

17. The invention set forth in claim 16 wherein:

said coating comprises at least one layer comprising polytetrafluoroethylene.

18. The invention set forth in claim 16 wherein:

said coating includes a fabric layer on which at least one layer of a fluoropolymer coating is applied.

19. The invention set forth in claim 18 wherein:

said fabric layer is a woven canvas.

20. A method of supporting and conveying sheet material which has been freshly inked and discharged

from a printing press or the like without marring the freshly inked surface, comprising the steps of:

forming an ink repellent coating on a sheet supporting surface of a skeleton wheel;

treating a piece of fabric with a fabric softening agent; treating the piece of fabric with a liquid repellent subsequent to treatment with said fabric softening agent;

attaching the piece of fabric to the skeleton wheel to cover the sheet supporting surface, said attaching step including mounting the piece of fabric relatively loosely over the sheet supporting surface such that the piece of fabric is capable of accommodating relative movement between the sheet material and the sheet supporting surface substantially without marring or damaging the freshly inked sheet material; and

rotating the skeleton wheel to engage successive sheets of the sheet material in supportive and conveying relation with the piece of fabric.

21. The method of claim 20 wherein said step of forming an ink repellent coating comprises the steps of applying an ink repellent agent to a fabric base portion and securing the fabric base portion to the skeleton wheel.

22. The method of claim 20 wherein the skeleton wheel sheet supporting surface has a generally cylindrical shape interrupted by an opening extending the axial width of the skeleton wheel, said opening being bounded by a pair of generally radially inwardly di-

rected flanges, and wherein said attaching step comprises wrapping the piece of fabric about the sheet supporting surface and securing opposite ends of the piece of fabric respectively to the flanges.

23. A skeleton wheel for supporting and transferring a freshly inked printed sheet from a printing station of a printing press or the like without marring the freshly inked surface, comprising:

a wheel member having a generally cylindrical sheet supporting surface with an ink repellent coating formed thereon;

a fabric covering comprising a woven cloth treated with a fabric softening agent and then treated with a liquid repellent agent; and

means for attaching said fabric covering relatively loosely to said wheel member to cover said sheet supporting surface such that said fabric covering is capable of accommodating sufficient relative movement between a printed sheet supported and transferred thereby and said sheet supporting surface substantially without marring or damaging the printed sheet.

24. The skeleton wheel of claim 23 wherein said ink repellent coating comprises a fabric base portion with at least one layer of a fluoropolymer material applied thereon.

25. The skeleton wheel of claim 24 wherein said fabric base portion is formed from a canvas sheet.

* * * * *

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HUBBARD, THURMAN, TURNER
& TUCKER, a partnership

IN THE

Plaintiff,

DISTRICT COURT OF

VS.

HOWARD DEMOORE, d/b/a
Printing Research Development
Company

DALLAS COUNTY, TEXAS

Defendant.

JUDICIAL DISTRICT

PLAINTIFF'S ORIGINAL PETITION

TO THE HONORABLE JUDGE OF SAID COURT:

NOW COMES HUBBARD, THURMAN, TURNER & TUCKER, a partnership,
complaining of HOWARD DEMOORE, and, for cause of action, would respectfully
show unto the Court the following:

I.

Plaintiff is HUBBARD, THURMAN, TURNER & TUCKER, a partnership in
the practice of law doing business at 2100 One Galleria Tower, Dallas, Texas 75240-
6804. The offices of aforesaid partnership are located in Dallas, Texas.

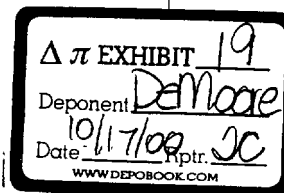
II.

~~Defendant HOWARD DEMOORE (DEMOORE) is an individual residing at~~

Defendant HOWARD DEMOORE is an individual.

III.

Service of process in this action may be had upon DEMOORE, individually,
by serving him at his residence located at _____ or by
serving him personally during normal business hours at his business office located at
2552 Royal Lane, Dallas, Texas.



IV.

Plaintiff brings this action for breach of contract; for failure to pay a stated account; for failure to pay a sworn account; and to recover the reasonable value of services rendered on the basis of quantum meruit.

V.

The damages sought, exclusive of interest and costs, exceed the minimum jurisdictional limits of this Court.

VI.

Beginning at least as early as January 2, 1981, Defendant had established an ongoing relationship with Plaintiff whereby Defendant authorized Plaintiff to provide legal services and incur certain expenses on Defendant's behalf, and whereby Defendant was to compensate and reimburse Plaintiff for such services and expenses upon receipt of an invoice from Plaintiff for such current charges. Pursuant to this arrangement, Plaintiff set up various internal files having the "client I.D." of PRDC, and thus was able to keep track of all services and reimbursable expenses which were performed or incurred at the specific instance and request of, and thus were to be paid for by, Defendant.

VII.

Pursuant to this arrangement, Plaintiff provided and incurred those services and expenses, at the specific request of Defendant, that are reflected in Exhibit "A" attached hereto. Defendant has failed to fully pay for all the services provided, and expenses incurred, by Plaintiff for and on behalf of Defendant.

VIII.

Plaintiff would show that Defendant entered into agreements and contracts with Plaintiff under which Defendant was and is to currently pay for the services rendered, and expenses incurred, by Plaintiff as are reflected in Exhibit "A" attached hereto. Plaintiff has fully performed all of the services, and incurred all the expenses,

required of it pursuant to the aforesaid agreements, and the several sums of money charged for same, as reflected in Exhibit "A" attached hereto, are just and reasonable charges therefor. Defendant, however, has failed to completely pay the sums due, which are now past due, pursuant to the aforesaid agreements and contracts and, therefore, Plaintiff has been damaged in the sum of \$11,110.45 plus interest thereon from September 24, 1982 until said sums are paid.

IX.

Plaintiff would further show that the services and expenses reflected in Exhibit "A" attached hereto were rendered and incurred by Plaintiff at the specific instance and request of Defendant, for and to Defendant on account on which a systematic record has been kept, which account is duly verified by Exhibit "B" (which is attached hereto and made a part hereof for all purposes). In consideration thereof, Defendant became obligated to pay Plaintiff the \$11,110.45 charged for such services and expenses shown on said Exhibit, with interest thereon from September 24, 1982 until same is paid, which services and expenses were customarily and reasonably worth the several sums of money charged therefor, with all just and reasonable offsets and payments being already credited thereto.

X.

Plaintiff would further show that Defendant authorized, requested and induced Plaintiff to render the services, and incur the expenses, that are reflected in Exhibit "A" attached hereto. Defendant was well aware of the increasing amounts which became due to Plaintiff for these services and expenses and never questioned or objected to any such services or expenses or the amount charged therefor. Defendant has failed, and continues to fail, to fully pay the amounts which are now due, and past due, on this stated account which is reflected in Exhibit "A" attached hereto, and there are no just and lawful offsets to said sum of \$11,110.45, which should bear interest thereon from September 24, 1982 until same is paid.

XL

Plaintiff would further show that Plaintiff rendered the services, and incurred the expenses, that are reflected in Exhibit "A" attached hereto, for the benefit of Defendant under such circumstances that were reasonable to notify Defendant that Plaintiff expected to be compensated for such services and reimbursed for such expenses. The reasonable value of said services rendered and expenses incurred is set out in Exhibit "A" attached hereto, and Plaintiff is now entitled to recover the amount now due therefor, \$11,110.45, on the basis of quantum meruit, together with interest thereon from September 24, 1982 until said sum is paid.

XV.

Finally, Plaintiff would further show that Plaintiff has repeatedly presented its claims arising out of the aforesaid account and stated account to said Defendant and, although more than thirty (30) days have expired since such demands were made, the aforesaid Defendant has failed to fully pay such account. Because of Defendant's failure to pay this indebtedness, it was necessary for Plaintiff to direct the undersigned attorney to institute this action and Plaintiff has thus been forced to incur the costs and expenses of being represented by said attorney in this matter. In accordance with Article 2226, Texas Revised Civil Statutes, Plaintiff hereby sues to recover such reasonable attorney's fees incurred in this action.

WHEREAS, PREMISES CONSIDERED, Plaintiff prays that the Defendant, HOWARD DEMOORE, be cited to appear and answer herein;

FURTHER, Plaintiff prays that on final hearing:

- (a) Plaintiff be granted judgment against HOWARD DEMOORE for \$11,110.45 as the principal amount due on the account;
- (b) Plaintiff be granted judgment against HOWARD DEMOORE for prejudgment interest at the rate of six percent (6%) per year on the account, commencing on September 24, 1982 and continuing until the date of judgment herein;
- (c) Plaintiff be granted judgment against HOWARD DEMOORE for reasonable attorney's fees;

(d) Plaintiff be granted judgment against HOWARD DEMOORE for all costs of Court;

FURTHER, Plaintiff prays that on final hearing Plaintiff be granted judgment against HOWARD DEMOORE for post-judgment interest at the rate of nine percent (9%) per year on the total amount of the judgment described above from the date of judgment until paid; and

FINALLY, Plaintiff prays that on final hearing Plaintiff be awarded such other and further relief, both general and special, at law or in equity to which it may show itself justly entitled.

Respectfully submitted,



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